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ABSTRACT

This overview is intended as a practical guide to assist vocational educators in dealing with the special problems that arise when disadvantaged and handicapped students pursue a career opportunity through vocational education classes on the secondary level. Concerns of the mainstream vocational teacher are discussed, and suggestions are provided for the development and implementation of the skills check for identification of handicapped and disadvantaged students. The next section summarizes and highlights the various disadvantaged and handicapped labels that educators come in contact with and makes these labels relevant to mainstream vocational instructors and paraprofessionals. Pros and cons of the curriculum modification quesion are then briefly pointed out. These resource persons are recommended as sources of aid and information: counselors, special educators, and student aides and peer tutors. Appendixes, which amount to over one-half of the guide, include definitions of disadvantages and handicapping conditions, examples of skills checks in the mathematics and reading areas, daily lesson plans for use with peer tutors or student aides, examples of study guides, and an annotated bibliography. (YLB)

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Teaching Handicapped and Disadvantaged Students in Secondary Mainstream Vocational Classes

A Practical Guide

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1-1: INTRODUCTION

This short work is written with the mainstream vocational educator in mind. It is a consciousness-raising commentary on one phase of our field and has a dual purpose. One goal is to create in the minds of vocational instructors and para-professionals the awareness that the problems they face with certain Disadvantaged and Handicapped students are realistically approachable and that help is available in meeting the challenges presented by such students. The other goal is to facilitate better communication among the various administrative and educational departments within school districts which have an interest in serving Disadvantaged and Handicapped students.

I have spent many years, in both vocational and special education settings, teaching Disadvantaged and Handicapped students in a wide variety of subject areas. This overview is intended as a practical guide to assist vocational educators in dealing with the special problems which arise when Disadvantaged and Handicapped students pursue a career opportunity through vocational education classes on the secondary level.

Vocational teachers have already had experience dealing with Disadvantaged and Handicapped students. The D and H students are the ones who, for one reason or another, have had difficulty with class curriculum that the majority of students have had no problems with. The D and H students are the ones who could greatly benefit from reduced class sizes, modification of curriculum, extra help in both the academic and/or hands-on areas of the curriculum, a different sort of grading criteria, or any other consideration which reflects an awareness of the students Disadvantaged or Handicapped condition.

Being aware of the presence of students with D and H conditions is is the paramount first step in the process of planning an effective strategy in order to teach these same students a particular skill or body of knowledge. For this reason I have included an extensive (but admittedly incomplete) section regarding the identification of D and H students in vocational classes

D and H students are present in vocational classes and pose special problems for professional and para-professional instructors. Teaching any students (be they "normal" or D and H students) is largely a matter of personal style and commitment on the part of the individual instructor. This Writing is offered as a practical and general guide addressing the special problems posed by the D and H student who is enrolled in a vocational class. The contents of this writing are based on my own study and experience in the field and are in no way presumed to be complete or comprehensive. Rather, this work should be taken as a set of tips or pointers on how to deal effectively with the "special needs" population in the vocational classroom setting

Christopher W Carter

Roseburg, Oregon 1986

2-1: Mainstreaming

The term "mainstreaming" is widely used and understood by educators today. As used in the context of this manuscript the concept refers to the practice of enrolling certain students that have been identified as "Disadvantaged" or "Handicapped" in regular classroom settings in addition to whatever other special education classes have been deemed appropriate.

D and H students are frequently scheduled into the regular class, though, without the instructor having any proscribed manner of assessing, within the context of that class, the specific disadvantaged or handicapped condition of the student in question. In vocational classes such a lack of knowledge on the part of the instructor can prove to be frustrating if not disastrous. Various resources which can be of help in identifying students with such conditions will be considered in later sections of this writing.

Astute and experienced educators are, at times, able to pick out students (students that have <u>not</u> <u>necessarily</u> been identified as D and H) that will, in all probability, have trouble with some or all of the content of the class curriculum. Sometimes it will be a gut feeling or a word-of-mouth report of a students reputation that indicates to an instructor those students that may require extra help in a certain area. A primary concern of the mainstream vocational teacher, therefore, is to develop a consistent means of identifying <u>all</u> of those students that will require extra attention in class regardless of whether or not they have been previously labeled as having any D and H Condition.

For all teachers any <u>hit-or-miss</u> process of identifying students for whom the curriculum may present problems can be a source of added frustration and stress in an already

tense situation. For vocational educators this problem can be compounded by the higher than average "at risk" students which tend to gravitate into the vocational areas to explore career choices and to gain necessary occupational skills. The vocational teacher will be all to familiar with this recurring problem: students who can't read, write, or do elementary mathematics are signing up for classes in which they are set up to fail--suffering as they do from the delusion that they can get by on manual dexterity in a world of rapidly advancing technology.

The Author has found that the majority of students who fail in mainstream vocational class for reasons other than poor attendance do have some kind of disadvantaged or handicapped condition. Indeed, failure itself correlates so strongly with the presence of D and H conditions that the author has used failure in such a setting as a principle criterion of identifying D and H students in vocational classes.

If allowed to continue in class to the point of failure, a clear and observable amount of damage will have been done to the student's self-image, grade point average, and grasp of the subject matter. Far better to identify quickly those students who are at risk of failure--say within the first week or two. Even better than merely identifying them, it is desirable to determine which specific areas such students are likely to have trouble with, and then develop and implement a plan of action to better enable these "at risk" students to succeed.

3-1: Identification

Before a teacher can plan effective teaching strategies with respect to students with D and H conditions the teacher must know what specific student population is involved. The different classifications of D and H students are discussed later in this work. The author wishes at this point to clearly emphasize that educators in general and vocational teachers in particular need to know as soon as possible which students havewhich Disadvantaged or Handicapped condition.

One way to facilitate early identification of D and H students in vocational classes is to cross reference the class rosters of the vocational classes and those of the special education classes. Another is to use a method of testing right in the vocational class.

3-2: Skills Check (13)

The Author has found it helpful in furthering the goal of early identification of students who may have problems in vocational classes to develop and implement a test of reading and math skills. The test is tailor-made to each textbook and individual class curriculum in the vocational areas. This type of test is called "skills check" or criterion referenced test.(9,12,13) The author has administered this type of test, informally, to both beginning and advanced students in vocational areas for many years and the testing has always yielded informative results. The skills check is particularly helpful in identifying students with academic disabilities who would not otherwise be identified as having any D and H condition.

Development and implementation of the skills check in any particular vocational class is a simple process. The author hopes that vocational educators will find the concept agree-

able and the undertaking worthwhile if the decision is made to include such a test in one's own class curriculum.

The process is as follows:

A section from the text to be used in the specific class is selected. The section of text is copied onto a separate sheet of paper. The selection should be readable in 5 to 10 minutes. It should contain information specific enough to test for and should communicate sufficient knowledge to allow for conclusions to be drawn from it. Usually, one single spaced, typewritten page works out well if the selection is edited and composed properly.*

Questions are drawn from the material extracted from the text. The questions are aimed at testing for reading comprehension. Since individual students vary in test taking abilities a mixture of true-false, multiple choice, fill-in, and essay questions should be used. Bear in mind when making up the questions that this test is not for a grade. The purpose of the test is to ascertain whether any students will have trouble with the reading level of the text used in the class.**

Administering the reading skills check should not take more than 15 or20 minutes of class time. The test should be administered as soon as the round of schedule changes is over at the beginning of the term, when the class roster has settled out.

* #9 in the bibliography would be of assistance in creating test questions

** This assesment technique was described by John Havliczek at the VESN conference at Newport, Or. in 1981 as "Quick and Dirty".

It is important to follow the order of instructions given for the administering of the reading skills check:

> Pass out the reading material and inform the students that they are to spend the next 10 minutes reading and studying the paper. Emphasize that this test is not to be graded but that everyone is expected to do their best and that test taking rules apply.
>
> At the end of the ten minutes have the students pass the reading material back. Be sure to get them all (numbering or correlating them with a head count may be helpful).
>
> Pass out the question sheet and announce that you expect everyone to be finished within 10 minutes but that students who complete the test early can turn them in as they finish.
>
> At the end of ten minutes call time and collect the remainder of the tests.

Be sure to have clearly printed on the question sheet places for the students to fill in their names, the class, and the period or hour the test was administered.

During the test do not leave the room or expect student aides to be competent to handle the proceedure. Valid data is necessary on each individual. Cheating just cheats the teacher as well as the students out of valuable information. Similarly the correction and evaluation of the tests should be done by the instructor; it's the only way to get a feel for the data obtained.

The data should speak for itself if the test is developed and administered properly. It will highlight students who can be expected to excell in the class as well as those who will have trouble with the reading assignments. If 50% of the true-false, multiple choice, and fill in questions are

wrong or blank and if the essay questions reveal poor spelling, grammar, and sentence structure, then the student can be expected to have trouble reading the text.

The area of mathematics is also a trouble spot for many students. Sometimes students do not realize the practical application of a process that their math teachers have tried to explain to them. Sometimes, if new concepts or abstract thinking processes are difficult, students will lose interest in the subject and discount it as being unimportant. Some students may have had their ego's damaged in this area and because of a weak level of confidence refuse to have anything more to do with math. If a student comes into a vocational class which is geared to his or her vocational interests not knowing the mathematical processes which are prerequisites for successful completion of the curriculum, then this definitely constitutes an academic disadvantage.(5,8,15)

A situation such as the one just described, where a student enters a class without the prerequisite skill necessary for success in that subject, puts the teacher in an awkward position. Should the instructor spend time and energy remediating those deficient skills and thus subtracting that much time and energy from the majority of students who are ready for the curriculum? Or should the instructor concentrate his or her efforts on the students who enter the class already knowledgeable enough in most of the basic skills and are thus prepared to progress to more specific vocationally related subjects, therby letting the more deficient ones sink or swim as they will? This is a hard question that must be confronted by every vocational educator. The answer is to be found in an individual search of one's values, commitment, and priorities. No cut-and-dried solution is readily available.

It is advantageous, however, to ascertain which students are deficient in which areas as soon as possible within the time

frame of the class. A math skills check can be developed as a means to this end. A few rules to follow when a math skills check seems to be an appropriate component of one's overall curriculum are:

A math skills check does not substitute for the type of tests used by a mathematics department for placement purposes. Skills checks to be valid must test only for those skills required by the course curriculum and considered to be prerequisite for the subject(e.g.- knowing how to use a ruler and deal with fractions in a class on woodworking, or knowing how to deal with decimal numbers in the mechanics or machining fields).

A math skills check should be comprehensive enough to be valid* but should not take longer to administer than one class period.

For a math skills check to be reliable** the testing atmosphere must be controlled. As with the reading skills check, no part of the administration or evaluation process should be done by anyone other than the teacher who is directly involved in the class

As with the reading skills check, it should be emphasized to the students that the test is not for a grade but that students should do their best on the test in order to provide necessary information.

* Valid tests are tests which do in fact assess what they are purported to.

**Reliable tests are tests which yield pretty much the same results on subsequent trials as they did on the first.

> The use of calculators is discouraged. If the students understand the process involved, the calculator is just a tool to be used for efficiency, speed and accuracy. Knowledge of the process is what is being tested for and all work should be shown.

It is the author's hope that the skills check idea will be attempted and evaluated by each vocational educator individually and that will develop a system which is relevant to his or her own class. It is also hoped that the use of the skills check system will assist in early identification of D and H students in vocational classes and that this process will lead to a more broad range of services for the D and H student population. The earlier the identification is made the more time is available for the development and implementation of measures to assist these students in their troublesome areas.

Please refer to the appropriate appendix for examples of skills checks which have been used by the author.

4-1: D and H Conditions

A lot of very good information is readily available on handicapping conditions and the legal responsibilities of school districts regarding handicapped students elsewhere.(4,5,6,15,16) The author wishes, in this section, only to summarize and highlight the various D and H labels that educators come in contact with and to make these labels relevant to mainstream vocational instructors and para-professionals.

The area of handicapping conditions can be usefully broken down into two categories: physical and mental. The physical handicaps are relatively self-explanatory and may or may not be accompanied by an impairment in the mental area. Essentially, the areas of physical and mental handicaps are separate issues although they are both involved in legal descriptions and the labeling of students, and they tend to have a common meeting ground in the emotional overlay which can easily become a problem for both physically and mentally handicapped persons.

4-2: Physical Handicaps

Briefly, The areas of physical handicapping encountered in the educational setting are those of orthopedic impairment, visual impairment, and hearing impairment. The problems inherent in these handicapping conditions for the vocational educator are relatively obvious and compensatory steps are possible for each condition within the vocational classroom. (5,14,15) As a rule, the vocational teacher can expect to be contacted well in advance of the actual enrollment of a physically handicapped student in his or her class if the physical impairment is such that special modifications of the classroom setting are required. This contact should come from a specialist working within the school district in the appropriate special education program wherein the student

has been placed.

If the students only handicap is physical then modification of the physical environment should be sufficient to allow a highly motivated but physically handicapped student to succeed in any vocational classroom setting.

4-3: Mental Handicaps

The area of mental handicaps is much less cut and dried than that of physical handicaps. Mentally handicapped conditions are divided into the areas of Mental Retardation and Specific Learning Disabilities. The category of Mental Retardation is itself divided into three separate groupings: severe/profound, moderate (Trainable Mentally Handicapped), and mild (Educable Mentally Handicapped).(3,5,8,14,15)

Students with a label of Mentally Handicapped will have been put through a process of testing and evaluation and will have been placed in the most appropriate special education program available. The principle means of evaluating persons for the purpose of categorizing them into mentally handicapped groupings have to do with intelligence and adaptive behavior. The measure of I.Q. is arrived at, the student is labeled accordingly, and then further testing is administered as needed.

I.Q. scores, then, are the major determinants of the broad categories of mental handicaps. Severe/profoundly mentally handicapped persons will have scored below 25 on the I.Q. testing. Trainable mentally handicapped persons will have scored above 25 and below 49 on the I.Q. testing. Educable mentally handicapped persons will have scored between 50 and 79 on the I.Q. testing.(8) These categories very slightly from state to state. Persons having been labeled Learning Disabled will have average or above I.Q. test scores.

Severe/profoundly mentally handicapped persons will probably never reach the level of secondary vocational classes.

4-4: TMH

Trainable Mentally Handicapped students are not usually involved in the mainstream vocational classes. They are placed in a self contained classroom for most of the school day and if they progress to the point of viable vocational training, they are usually involved in specific on-the-job training placements in community settings. Generally TMH students will receive OJT at sheltered workshop types of agencies.(2)

The TMH students' special education teacher will have contacted the vocational teacher well in advance of a trial run at placing a TMH student in a mainstream vocational class so identification of this type of student will not be difficult.

Special one-to-one help is recommended for TMH students in vocational classes because safety would be a primary consideration in such a situation.

One to one help is a necessity when dealing with TMH students not only for safety's sake but also in order to teach these students anything usable at all. They are not typically self starters and will require someone to be physically present with them at all times unless and until a job becomes less novel and more repetitious. The person with the student (trainor, tutor, or teacher) must keep in mind that TMH students require step-by-step instructions and many, many repetitions of a task before they can be left on their own.

Academically, a reasonable goal for TMH students in vocational classes is that they learn the names of all tools used and be able to explain, using simple language, how the tools are used, what the job or task entails, and how the task is

accomplished. These students usually need communication skills and these skills can be enhanced in the vocational classroom setting, but the person dealing with the student will need an inordinate amount of patience and persistence.

Physical work is very important for TMH students. The hands-on shop work in a vocational class can provide valuable training in eye-hand coordination as well as teaching concepts concerning efficient movement and tenacity. Accomplishing something in the shop can enhance their self esteem and create successful feelings.

Vocational instructors should decide in advance, in conjunction with the appropriate special education teacher, what specific skills and knowledge can be taught to the individual students, what timeline should be kept in mind, and what strategies will be used. Realistic, concrete, and achievable goals should be outlined which can be incorporated into the students Individual Education Plan as a vocational component.(15)

The author recommends a staff to student ratio of no more than 4 to 1 when teaching TMH students in vocational classes. Although a 1 to 1 ratio is ideal, the proper learning environment and individualised attention can be maintained with ratios up to 4 to 1. A higher ratio than this tends to create the kinds of situations in which even the most organized and effective teacher can feel rushed, spread to thin, and unable to provide the 1 to 1 time necessary when teaching TMH students.

4-5: EMH

Educable Mentally Handicapped students are mainstreamed as much as possible but are still well entrenched in self-contained classroom settings with special education teachers. These individuals typically have moderate to severe problems in reading and mathematics, and they would show up glaringly

on the skills check as being in need of considerable extra attention in order to be successful with the class curriculum. (3,5,8,14,15)

Communication between the teachers of EMH students and the mainstream vocational teachers may or may not be adequate to ensure proper early identification and assistance regarding the EMH student in the vocational setting. The vocational educator may want to initiate contact with the appropriate special education teachers in order to assure an adequate flow of information regarding EMH students.

EMH students, as all people, are individuals and will defy all attempts to treat them as a homogeneous group, having identical characteristics and abilities. Therefore it is imparative to approach each student individually to get a feel for what they are capable of. "...the primary handicap is often accompanied by some other disabling problem.... there are no discrete boundaries or uniform group types."

Academically appropriate expectations for EMH students would include learning the names of tools, parts, and equipment, reading simple instructions and layout drawings with help, being able to verbally discuss proceedures in a way which shows a basic understanding of the processes involved, and learning measurement techniques.

In the area of hands on shop work for EMH students the instructor can expect to be able to let the student work independently on a task after the student has demonstrated a knowledge of shop safety and the proper step-by-step proceedures involved in any given task. The teacher must count on spending a reasonable amount of time with the student in a one-to-one situation before this level of independence is reached on any given task. Then, for a different task, or a further step,

more one-to-one instruction if needed.

Don't expect to be able to give mere verbal instructions to the EMH student and let it go at that. Although giving verbal instructions is an excellent teaching method for EMH students, the words must be coupled with one-to-one supervision of the task in the early stages to ensure that the messages are received and understood.

EMH students must be guided, cajoled, sometimes even harassed into doing anything unfamiliar. A teacher dealing with EMH students in vocational classes must be prepared to spend days working with each student on skills and procedures which, once learned, will allow the student to operate semi-independently on the learned task. The goal of minimal supervision should be approached slowly and the groundwork for it laid thoroughly.

Patience and persistence pays off in many desirable returns as the EMH student progresses. They can learn to operate machines and do repetitive tasks and use measuring devices and perform simple math functions. The EMH student can not be expected to grasp a logical sequence, however, without being guided through each step many times in order to "track in" the process.

EMH students will typically, but not universally, have some emotional overlay present which may tend to complicate the learning process. "It is often difficult, if not impossible, to determine which came first, the emotional disturbance or the mental retardation."(8) These emotional conditions may include a desperate need for praise, a wish to succeed which is out of proportion with their potential, a stubborn streak or quick temper, or perhaps a tendency to give up if success is not easily and immediately achieved. The author has found it helpful, when teaching EMH students with these sorts of emotional problems, to think of the student as being mentally

about 5 or6 years old while physically they will range from 14 to 21 years old. Keeping this in mind helps one to maintain the proper professional attitude regarding these students.

4-6: LD

Learning Disabled students are, as a rule, virtually totally mainstreamed. They are involved in special education programs and attend special education classes for specific periods each day but otherwise they are integrated into the student body of the secondary school in such a way as to make them indistinguishable from the rest of the students. LD students have mild to severe problems in reading and/or mathematics. They may show glaring deficiency on the skills check or they might show not much deviation from the norm at all. These students, being of average or above intelligence, have sometimes learned to compensate for any inherent disability by developing and relying on their strong points.(5,14,15)

Again the author must emphasize the individuality of students with handicapping conditions. The category of Learning Disabled is extremely ambiguous. No one knows what is really different about LD students- all anyone knows is that these students have some kind of internal miscommunication which interferes with the assimilation and communication of information and concepts. This interference seems to be physiologically based and one should not think of it as being the students' fault.

The LD student in vocational class may have trouble with any given component or combination of components in the curriculum. Early identification of LD students will help pinpoint potential trouble spots.

Since LD students are of average or higher intelligence they require different teaching strategies than those used with mentally retarded students.

One strategy to use, when possible, with LD students who are active in both the special education and vocational programs is to incorporate some of the vocational curricula into the special education class. Lists of vocabulary words, sections of the text, or specific math processes are all examples of problem areas which can be worked into the special education curricula quite easily.

Taking good notes during lectures is difficult for any student, and doubly so for the LD student. Pre-written and duplicated hand-outs with the major topics and explanations in outline form would assist the LD student in assimilating the necessary knowledge.

Study guides are excellent for LD students if they include information which will be tested for later.(Please see appropriate appendix for examples and explanation of "study guide")

The LD student, while outwardly appearing quite "normal", has a genuine disability. Reading and math are two major areas of developmental lag in these students. Another area of developmental lag is potentially in dealing with the spacial and temporal world. LD students sometimes have difficulty with the proper ordering of sequential tasks or differentiateing left from right. The author recommends that vocational teachers be aware of the LD students in their classes and take steps to ensure the success of the student in the same spirit as would apply if the student were outwardly physically handicapped.

Working independently is an appropriate and highly desirable goal for LD students and is easily achievable although it may take some time and one-to-one effort in the initial stages of instruction.

If you suspect that a Specific Learning Disability is present in any certain student then contact the appropriate counselor

or Special Education teacher to make a referral for testing or an inquiry as to the special education status (if any) of the student. If no special education testing has been performed then perhaps the vocational teacher's input can start the evaluation process going.

4-7: SED

One handicapping condition which the author found unable to include in either the physical or mental impairment categories is that of Severely Emotionally Disturbed (SED)

The SED student may or may not have a mental or physical impairment but is emotionally handicapped to such an extent that his or her emotional makeup acts as an inhibitor in the learning process.(14,15) Severe emotional disturbances, used in this context, cover quite a broad range of affect. A student may fall into this category as a result of exhibiting psychotic, school phobic, autistic, or belligerent tendencies. They can be manic or depressed. Typically, but not exclusively, these are students with "attitude problems". They also typically have trouble concentrating or attending to a task. Severe emotional difficulties may manifest as problems of behavior and socialization. These students may or may not show up on a skills check as being deficient in basic skills.

One very important technique to keep in mind when teaching students with severe emotional problems is consistency. The SED student can not survive in an atmosphere where the rules change from day to day and expectations are not clearly delineated and adhered to.

Avoid power struggles of any kind with this type of student. A teacher doesn't need to struggle with a student for authority. The teacher is the authority and this authority cannot in reality be challenged by a student. A low key but powerful stance with the SED student will avoid any tendency to push

limits. When limits are pushed, consequences should be clear, reasonable, and anticipated.

Safety in the shop should be emphasized with SED students as emotional control is notably absent in this type of individual.

A good line of communication between the vocational department and the special education department will facilitate early identification of any SED students in vocational classes, and assist with any necessary additional help with regard to behavior control.

At times it seems that all adolescents demonstrate symptoms of emotional disturbance. The teenage years are difficult. The majority come through little worse for the wear but the occasional individual, for whatever reasons, is unable to, or unwilling to, cope with life's challenges. Vocational instructors cannot be expected to function as psychotherepists but we can't handle what we don't understand. The author recommends that teachers in general, and vocational teachers specifically, learn all they can about the causes and cures of emotional problems and techniques of counseling and communication.

4-8: Labeling

Categories of handicapping conditions can be misleading because there is some crossover of symptoms in the conditions which is not immediately evident in the labels. A good thing to keep in mind when dealing with handicapped students is the old saying "where there's smoke- there's fire". An identification of "handicapped" is indicative of some special condition or problem that must be confronted by the mainstream vocational teacher in the best interests of the student. The problem is most definitely an <u>individual</u> affair and not subject to understanding in terms of broad labels and general categories.

Categories of disadvantaged conditions are specific to limited areas and categories of handicapping conditions seem specific within their parameters but "...there are particular techniques that can be very successfully employed for some handicapped persons that are unnecessary or even wasteful for others"....(4) To be effective with D and H students in vocational classes the author recommends that teachers, as much as possible, become familiar with the D and H students as individual personalities. What works for one may not work for another.

Disadvantaged conditions differ from handicapping conditions in some ways and in others they are very similar. The most important difference between them, as discussed in the literature on the subject, is that a "Handicapping Condition" is a legal description which binds the school district to providing special services to the handicapped student. "Disadvantaged", however, is not a legally binding situation even though disadvantaged students often differ from handicapped ones in a matter of degree only.

4-9: Disadvantaged Conditions

Disadvantaged conditions are of three types: Limited English Speaking, Economic and Academic. The criteria for inclusion in the limited english speaking disadvantage is that English is not the primary language for the student and that communication in English is difficult. The criteria for inclusion in the economically disadvantaged category is that the family income of the student falls below a certain level, which is, typically, that level below which a student qualifies for a school lunch program. The category of academically disadvantaged is more ambiguous. The author has worked for years in the area of vocational/special education and has found few clear cut definitions of this term. The appropriate appendix will shed further light of the subject of academic disadvantages and at this time the reader is invited to turn to it. (also see 5 and 15) The author has, however, identified hund-

reds of academically disadvantaged students on the bases of skills check results, referals by teachers or counselors, failure in the vocational class for reasons other than poor attendance, or on the basis of the students' enrollment in a special education program but without a "Handicapped" label. (Special education classes are available to students without "handicapping" conditions if they have been identified as performing at a specified number of grade levels below the grade they are enrolled in.)

Obviously the author has taken as a rule of thumb the concept that an academic disadvantage consists of not being properly prepared to learn what is being required as curriculum in any particular class. The skills check results, referals, failures, and enrollment in special education classes all give evidence that improper preparation for a class is an academic disadvantage.

Often the disadvantaged student will have a low level of motivation. Disadvantaged students may need strong, clear directions (both written and oral) in order to shake them loose of the tendency to "float" in class and waste time (their own and other students').

Specific gaps in the knowledge which is necessary to benefit from the class' curriculum can be filled in by using special learning groups or information/study packets. Disadvantaged students should be able to assimilate the necessary processes or information content in a relatively short amount of time. If any real problems in assimilation should become evident, then referal for special education testing is possibly indicated.

Except for the filling of the gaps in the prerequisite knowledge the disadvantaged student should be integrated into the class as much as possible. Expectations regarding behavior and production for the disadvantaged student should be the same as they are for the whole class.

5-1: Curriculum

Vocatuonal educators find, as do all educators, that some of their students, for one reason or another, are unable to grasp the material in an effective manner which is presented within the class. Upon determining such inabilities to be the result of causes beyond the individual students' present control, the educator has an obligation to consider, if not to implement, modifications in the regular curriculum as they would apply to such identified cases. Convincing arguments both for and against modifying the regular classroom curiculum for students with learning difficulties can be put forth. In the end, each vocational teacher will make the decision for or against based upon his or her own values, priorities, and teaching styles.

The author will, only briefly, point out some of the pros and cons of the curriculum modification question although the list must necessarily be incomplete.

On the pro side we consider that:

> The student will, in all probability, without curriculum modification, receive a lower grade in the class than would accurately reflect the amount of information he or she has actually gained in the class were the student's handicapping condition or disadvantage taken into consideration.
>
> The student with a handicapping condition or disadvantage would probably gain more information from the class curriculum if the curriculum were modified with the student's particular condition in mind.
>
> Although for curriculum modifications to have optimal effect they should be tailor-made to the specific student, a somewhat generalized and standardized modification can

be made on the basis of the handicapping condition or disadvantage which applies.

It may be relatively easy to remediate specific deficiencies in math skills which are necessary to be successful in the class(eg- The author has seen many vocational teachers include a unit of requisite math skills right in their regular course outline).

It may be a perception, on the part of the vocational teacher that he or she has a legal responsibility to provide a modified curriculum for D and H students due to the laws which have been passed in this regard.

On the con side we consider that:

Vocational teachers, like all teachers, have a limited amount of time and energy to spend in preparation for their classes.

It is not necessarily the job of the vocational teacher to remediate deficiencies in basic skills or to take such deficiencies into consideration when planning a course outline.

It may be a perception on the part of the vocational teacher that the rest of the students would suffer if less time and energy is available for them.

There may be a tendency, on the part of the vocational teacher, to feel that students should not have reached their present grade level without knowing the basic skills necessary to succeed in the vocational class.

There are of course, many more factors which could be cited regarding the pros and cons of modifying vocational curricula

for handicapped and disadvantaged students. The author is satisfied that if a vocational educator is convinced of the need to modify his or her curricula for a student with a Disadvantaged or Handicapped condition then the means to do so will become evident.

A few examples of curriculum modification within this context could be helpful at this point:

In the case of an individual with severe reading problems, use study guides (please see appropriate appendix) which teach condensed, specific information which is aimed at answering questions which will be tested for:

And/or forget the academics in order to concentrate on hands-on skills in the shop areas:

And/or make use of any professional or para-professional staff available to add extra help with this population of students:

In the case of a student who has not learned the prerequisite math processes, use information and self-test packets which teach the specific skill necessary:

And/or pull a small group of students aside, if time allows, and personally teach the deficient skill:

And/or make use of any professional or para-professional staff available to add extra help with this population of students.

(also see 5,10, 14,15)

5-2: Math

Math is an important area within any vocational subject. Any vocational teacher would agree that there are students in vocational classes who do not possess the basic math skills that they need in order to successfully complete the course curriculum. Math can be a frustrating subject for any student and even more so for D and H students. Regarding math, D and H students can be caught in a failure loop where their emotional response to anything mathematical will be strong enough to keep them from progressing in the subject even if they have the ability to learn it. Making a particular process relevant to the student's career concerns can help to break this cycle. Where better to accomplish this than within an area of vocational interest?

The author recommends using some kind of testing or identification process to determine which students are deficient in which required math processes and then the implementation of a proceedure to teach these specific skills as they relate to the vocational course curriculum.

Special education teachers can be useful and appropriate resources for vocational teachers who have students who are taking an active part in both the vocational and special education programs. The lines of communication between both these departments should be open in order for the teachers in their respective areas to work together toward the common goal of helping the student achieve a higher level of employability.

Open lines of communication between the vocational department and the math department should also exist. Cooperative efforts between these two departments will facilitate the student learning the needed function at the time that it would be the most relevant to the student. A Vocational Math class can be developed to help with this process.

Oftentimes a student has merely forgotten a math process which was learned in an earlier grade in school and then lost to them through disuse. In a situation such as this a simple review may be enough of a memory jog for the student to recall and put to use the relevant process. But a simple review will not be adequate to teach the student something entirely new. The author feels that some provision can and should be made to ensure that necessary math skills be aquired by the student in a vocational program.

5-3: Grades

All educated people know what a grade generally represents: the ability of a student to retain and communicate the information that a teacher has deemed important in a certain subject area. This retention and communication comes easier to some students than to others. For the D and H student, this is typically a harder process than for the "regular" student. For some students the process of retention and communication of information is such an easy matter that they become bored and disinterested in their classes. These students, whom I would call "easy achievers", may get to a university setting and fail there because they haven't learned how to try; they haven't been made to push beyond the limitations of their lazy inertia. Conversely, students for whom testing is and has been especially difficult have received many failures in the course of their school experience no matter how hard they have tried. The frustration they have felt at trying and failing anyway has turned to apathy. Such students no longer care about grades.

The author feels that there is something inherently unfair about a system which doesn't take effort into consideration.

It is the ultimate value in our culture to get results. The "bottom line" on any job is whether or not it was accomplished.

The author feels that the job of education includes teaching values with regard to effort. The author recommends that grading systems be based, at least in part, on effort-- with consideration given to ability, especially for D and H students who need all the encouragement and success possible.

6-1: Resources

Vocational educators are sometimes isolated in their areas by virtue of being housed in a separate building, perhaps a building which is on the periphery of the campus. Or they may have a tendency to feel in a second class possition with respect to the rest of the secondary school's departments which are more academically oriented. A school's, or a district's, emphasis may or may not recognize vocational education as a high priority item.

The author feels that vocational education should be a high priority in all secondary school settings. Foresightful career planning, guidance, and training are essential when one considers today's uncertain job market. These considerations are most important when the non-college bound student is held in mind. The D and H student's transition from the school environment to the world of work is on very shaky ground without careful planning and training in specific marketable skills.

Vocational educators should have an esteemed place in any secondary school setting and they should feel well integrated into the district's goals and objectives. Vocational education should be high up on any school district's priority list.

Communication is the key to losing the isolated feeling which comes from being located on the outskirts of a school's physical plant. Vocational educators can find support and valuable information among the faculty members in other departments. Good lines of communication between vocational

educators, counselors, special education teachers, and other departments will accomplish much toward solving the problems encountered when D and H students enroll in vocational classes.

6-2: Counselors

Secondary level school counselors deal with numerous students. Each student needs individual scheduling help, career guidance, and sometimes psychological counseling or an individualized behavioral program. Counselors are busy people, especially if they have other duties as well-- such as athletic coaching or being in charge of a club or other activity. Their time, consequently, is often difficult to procure unless they share a sense of necessity in providing extra attention to an individual case.

Counselors have access to students' educational records and therefore it is appropriate that they should be available for consultation regarding any student's educational background. Some counselors are highly informed and informative about the students on their caseload. However,the existence of certain types of communication breakdown render school counselors uninformed as to the students' educational background. Some records, for instance, regarding students with handicapping conditions are sometimes shunted to the appropriate special education teacher rather than the appropriate counselor. This situation can occur most readily in cases where the student is changing schools within a district or coming from out of district as a new student. In either case, the counselor may have no record of the special condition.

Counselors are called into a situation for various reasons; most of these are negative, such as failure notices, attendance problems, or concerns over inappropriate behavior in the classroom. The author asserts that a more finely tuned system of communication between counselors and vocational

teachers would reduce last minute surprises and situations which have gone from bad to worse before the communication takes place.

One of the counselors'major areas of responsibility is scheduling. The class schedule of each student is generally arranged by, or at least approved by, the student's counselor. Therefore the more information a counselor has regarding a student's interests and aptitudes the more intelligent and appropriate the scheduling process becomes. For example, if a counselor is informed of a student's interest and aptitude in a vocational area and at the same time is informed about the student's deficiencies in math skills then the counselor can attempt to influence the student in the direction of the math class necessary to meet those needs.

Counselors can be of great assistance in setting up behavioral contracts and perhaps delving a little deeper into a student's psychological problem areas. Counselors can be good sources of information. It will not raise any eyebrows to suggest that counselors do not have all the answers to problems raised by D and H students in vocational classes; but help from the counseling department should not be discounted as being only interventionary. Counselors can help in early identification and referal for evaluation of students who may be headed for problems with vocational curricula. The resources that one has at one's disposal should be used in the most complete manner possible.

6-3: Special educators

Special education teachers are the best source of direct knowledge regarding Handicapping Conditions. They are also the best resource for information regarding which students have been identified as having which handicap. They are familiar with the processes of testing used to identify and evaluate students vis-a-vis handicapping conditions. The

special education teacher will know which reading grade level their students are functioning on or what process the student is currently working on in the math area.

Good communication between the vocational department and the special education department helps the teachers in both departments. The vocational teacher needs information about skill levels and capabilities; the special education teacher needs information about interests and values. Sometimes vocational material can be worked into the special education curriculum as mentioned in an earlier section. Communication between vocational teachers and teachers involved in the EMH and LD programs can be especially helpful in determining whether a particular student has a physiological disability or a motivational problem.

Occasionally, even at the secondary level, a student with severe learning problems but who hasn't as yet been through any special education evaluation may turn up. In a case like this, referral to the special education department (or the appropriate counselor) would assist in the student receiving the help he or she needs. There are usually channels already set up within the school system for this type of referral.

6-4: Student Aides and Peer Tutors

The use of student aides and peer tutors for extra help with D and H students is questionable. The author has had enough experience with the situation of students helping other students to know that it does work when the right combination of circumstances is present but that it is a dismal failure otherwise. Student aides and peer tutors will never fill the role of professional and para-professional help in the classroom. Students vary in emotional makeup, levels of expertise, social skills, motivations, etc. The transient status of all students makes it impossible to count on them from year to year or even from term to term.

For a student aide to do even an adequate job of giving extra assistance to handicapped or disadvantaged students in a vocational class the aide must be exceptionally mature and committed to the task at hand. Tutors in vocational classes who help D and H students through the curriculum must know a lot about a lot of things--too many things for a student aide's limited background to prepare him or her adequately. The tutor must know thoroughly the curriculum of the class being taught as well as how to teach someone with learning difficulties. The tutor must be highly skilled in dealing with people socially and have a working knowledge of special education techniques. Students with the right background knowledge and skills are rare and to find one with the proper motivation to assist students with learning problems is almost impossible. Even if a student fits well with all these criteria, where will he or she be next year?

Without the proper combination of talents and motivations a tutoring session can easily degenerate into a lot of wasted time and effort. One of the things to watch for in particular is the session turning into a mere show for the tutor. The tutor will often end up doing the work for the student rather than going through the necessary steps and making the student complete the work. This effort takes patience and persistence and it is an absolute must in order to really teach a useful skill. The tutoring session may also turn into nothing more than a power struggle; the underlying question of "who is in control here?" may be confronted unnecessarily. Names such as "stupid" or "dummy" may be tossed around with damaging results. And, if the student is not highly motivated, the tutor may become bored and distracted, losing interest in the session.

If a teacher feels that using student aides to provide extra help with D and H students is truly necessary and prospective tutors are found who have the appropriate characteristics and

training in the necessary fields, then the author has one last strong recommendation: Make a daily lesson plan for the tutor to follow. Such lesson plans should briefly state the daily objectives and proceedures to be used during the sessions. Make this plan up to cover from four to nine weeks at a time as this will give the tutor and the student a longer view regarding what is to be accomplished in the class. The objectives on the daily lesson plan should be reasonable and achievable within the time allotted for the session. (Please see the appropriate appendix for sample daily lesson plans.)

6-5: Special Help

Money for special help in dealing with D and H students in vocational classes is available in grant form.(6) There is a lot of red tape and accountability involved in applying for and receiving the grants, however.

To receive special D and H money a target population must be identified and a need established regarding the population. After a district receives the grant it must be accountable for how the money was spent. There is usually local matching of funds required in order to receive a grant of this type. Vocational department administrators, special education administrators, and school district grant writers would have information about what is available in a given area regarding grants for the special programs.

The author worked under one such grant for years. The money was made available through a federally funded grant attached to the federal vocational monies already funneled into the school district. The grant was given for use specifically in the area special needs (D and H) students in secondary vocational classes. A program was designed to serve the needs of these students. The students were to receive assistance over and above what was available prior to the funding. Job descriptions were outlined and persons were hired. The

program was a great success.

The author was assigned the job title of "vocational Specialist." Qualifications for Vocational Specialist, Vocational Tutor, or what ever a person is called who works specifically with D and H students in a vocational classroom setting should include experience in a wide range of fields. They should have adequate training in most of the vocational cluster areas, be familiar with special education techniques, and have ability in mathmatics and mechanical aptitude. They should exhibit a high degree of ability in interpersonal communication. They should have an ever temperament and be very patient and persistent.

The functions of this job entail[1] identification of D and H students within the vocational program through the multiple channels of cross-referencing class lists from special education and vocational classes, the use of skills check results, referral by the vocational instructor in any particular class, tracking the students for failure due to reasons other than poor attendance, and prioritizing the students' needs for special instruction; (2) One-to-one and small group tutoring in academic areas and in hands on work in the shop, oral testing, reading material to the student, helping the student locate answers in the text, tutoring specific math skills, and teaching step-by-step proceedures in the shop; (3) Curriculum modification, making up study guides which are relevant to the information being tested for in the class, rewriting sections of the text or reading material so that the information given is more accessible to students with reading problems; (4) Liasoning between special education and vocational classes, making written and oral input within IEP situations, facilitate communication between the departments, develope Individual Vocational Education Plans when necessary; (5) Act as the hub in a communication network which includes various resources available to the D and H students and their instructors.

The author feels strongly that grant monies of this sort should be spent on qualified personnel. There is no substitute for professional and para-professional people working in a close way with students in the classroom and in work experience situations. This is especially true if the students have been included in a Handicapped or Disadvantaged catagory.

7-1: Recommendations and Conclusion

As stated in the introduction, the purpose of this writing is basically informational, as well as to suggest some new directions that vocational educators may not, as yet, have explored. It is the author's hope that the information contained herein will be helpful and timely in addressing the problems arising when vocational educators find themselves having to deal with D and H students in their classes. The author emphasizes that in most cases it will be up to the vocational instructor to initiate any moves to be made in solving these problems.

Enhanced communication is a positive step toward sharing necessary information regarding "at risk" students. This communication can only take place where all parties involved with the particular student are apprised of the status of that student on a regular basis. The vocational educator, in order to become a dynamic part of this process, will have to reach out to make the best use of available resources. The author believes that it is in the best interests of all educators--and ultimately of the students as well--that teachers explore all existing resources applicable to their curriculum and the students they instruct. The various communication lines discussed are, of course, not the only ones available to tap into but they are given here as places to start looking for assistance if the vocational instructor so desires.

As an example of interdepartmental communication, the author points out that special education teachers within any school district would make available in-service presentations to the

vocational department regarding handicapping conditions and disadvantages.

The author recommends specifically that a system of cross-referencing class lists between special education and vocational education classes be implemented so as to facilitate identification of "at risk" students at the earliest possible opportunity in the academic timeline.

Also, as a means to this same end, the author recommends the use of a skills check system; it has the advantage of being able to identify those students who can be expected to do well in the class as well as identifying those students who have not been previously labeled "D and H" but who will have trouble, nonethe-less, with the curriculum. A skills check pre-test for gaps in knowledge and ability regarding a particular curriculum has been used and relied upon by the author, and many others in education, for years. It will work if properly administered and will provide valuable information about each student.

The question of curriculum modification is, of course, an individual decision on the part of the teacher. The author urges that appropriate modifications be made, however, according to the handicapping condition or disadvantage with which the student struggles.

This small work is offered in the spirit of support and co-operation among a nationwide network of vocational educators. The author does not in any way feel that all the answers to the problems of the D and H student are here given; but it is hoped that some new insights and practical means of confronting such problems will be taken from this effort at shedding some light on a heretofore dimly illumined subject.

APPENDIX A-

Definitions of Handicpping conditions

and Disadvantages

The definitions here provided are given as examples of the types of definitions teachers will encounter. They will not necessarily agree word for word with the definitions given in any particular state or school district.

These examples are used by the Oregon State Department of Education and the Douglas County, Oregon, Education Service District.

HANDICAPPED STUDENT IDENTIFICATION

Students to be Identified as Handicapped Must be:

1) Individuals who are one of the following.

Mentally Retarded	Hard of Hearing
Deaf	Speech or Language Impaired
Visually Handicapped	Seriously Emotionally Disturbed
Orthopedically Injured	Other Health Impaired
Specifically Learning Disabled	

AND Who:

2) Are enrolled in an approved vocational program.

AND:

3) Because of their handicapping condition, cannot succeed in the regular vocational education program without special educational assistance.

DISADVANTAGED STUDENT IDENTIFICATION

(Excluding Physically and Mentally Handicapped)

Students to be Identified as Disadvantaged Must meet at Least One of the Following Criteria:

1) a. ACADEMICALLY DISADVANTAGED means that the inability to succeed in vocational courses is a direct result of one or more of the following student characteristics:

- o Math, reading or writing level below the demands placed upon the student in the vocational courses.
- o Study skills don't meet the demands of the vocational courses
- o Fear (avoidance) of academics due to past failure
- o Limited English speaking abililty

Operationally, academic disadvantage can be determined at the secondary level by reporting students enrolled in remedial programs or performing below grade level on standardized tests or failing a grade.

b. ECONOMICALLY DISADVANTAGED means that the inability to succeed in vocational courses is a direct result of one or more of the following student characteristics:

- o Family income is at or below national poverty level
- o Student or parent(s) or guardian of the student is unemployed
- o Student or parent of student is receiving public assistance
- o Student is institutionalized or under state guardianship

AND Who:

2) Are enrolled in an approved vocational program.

AND

3) Because of their disadvantaged condition, cannot succeed in the regular vocational program without special educational assistance

AND

4) Evidence of an inabililty to succeed MUST be available at the local level for each student identified as Academically or Economically Disadvantaged.

*HANDICAPPED VOCATIONAL STUDENT IDENTIFICATION

Students to be Identified as Handicapped Must be:

1) Individuals who are one of the following.
   a) Mentally Retarded
   b) Deaf
   c) Visually Handicapped
   d) Orthopedically Injured
   e) Specifically Learning Disabled
   f) Hard of Hearing
   g) Speech or Language Impaired
   h) Seriously Emotionally Disturbed
   i) Other Health Impaired

AND Who:

2) Are enrolled in an approved vocational program.

AND:

3) Because of their handicapping condition, cannot succeed in the regular vocational education program without special educational assistance.

*DISADVANTAGED VOCATIONAL STUDENT IDENTIFICATION

Students to be identified as disadvantaged must be:

1) Other than handicapped

AND:

2) Individuals who are one of the following:
   a) ACADEMICALLY DISADVANTAGED e.g.
   - Math, reading, or writing level below the demands placed upon the student in the vocational courses
   - Study skills don't meet the demands of the vocational courses
   - Fear (avoidance) of academics due to past failure
   - Limited English speaking ability

   Operationally, academic disadvantage can be determined at the secondary level by reporting students enrolled in remedial programs or performing below grade level on standardized tests or failing a grade.

OR:

   b) ECONOMICALLY DISADVANTAGED e.g.
   - Family income is at or below national poverty level
   - Student or parent(s) or guardian of the student is unemployed
   - Student or parent of student is receiving public assistance
   - Student is institutionalized or under state guardianship

   Operationally, economically disadvantaged can be determined by reporting students at the secondary level who are participating in a free or reduced lunch program, AFDC (Aid to Families of Dependent Children) program or work study program.

AND Who:

3) Are enrolled in an approved vocational program.

AND:

4) Because of their disadvantaged condition, cannot succeed in the regular vocational program without special educational assistance.

* As defined for vocational education program development and reimbursement purpose in the Carl D. Perkins Vocational Education Act of 1984, P.L. 98-524.

APPENDIX B-

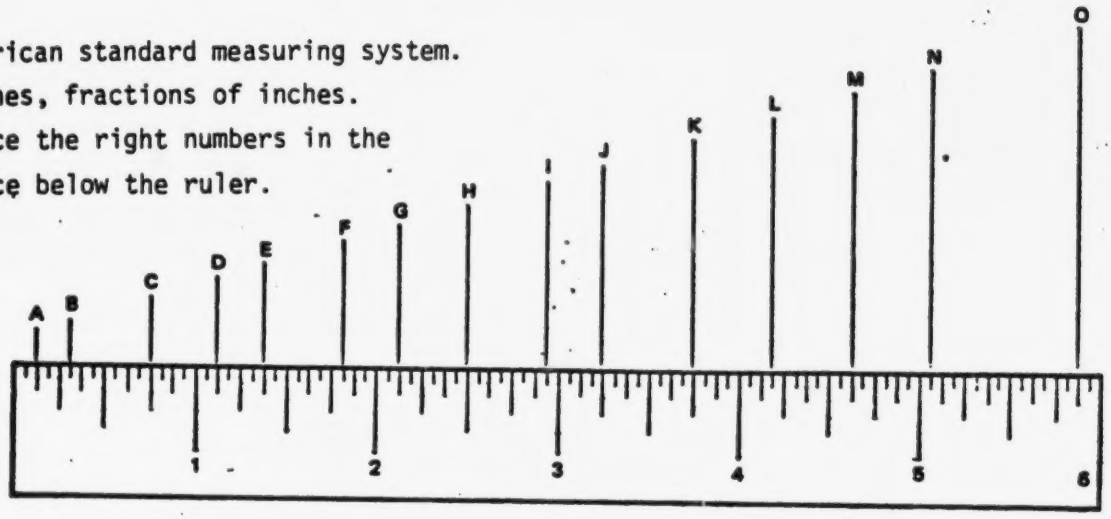
Skills Check

In this appendix are examples of skills checks in the math and reading areas which the author has used in a variety of vocational classes. They are intended only as examples of the sort of test which was discussed earlier in this work and not as usable documents in their own right.

Skills checks of this sort can be custom tailored to fit the exact curriculum of any vocational class.

SKILLS CHECKLIST
MEASURING

American standard measuring system.
Inches, fractions of inches.
Place the right numbers in the space below the ruler.

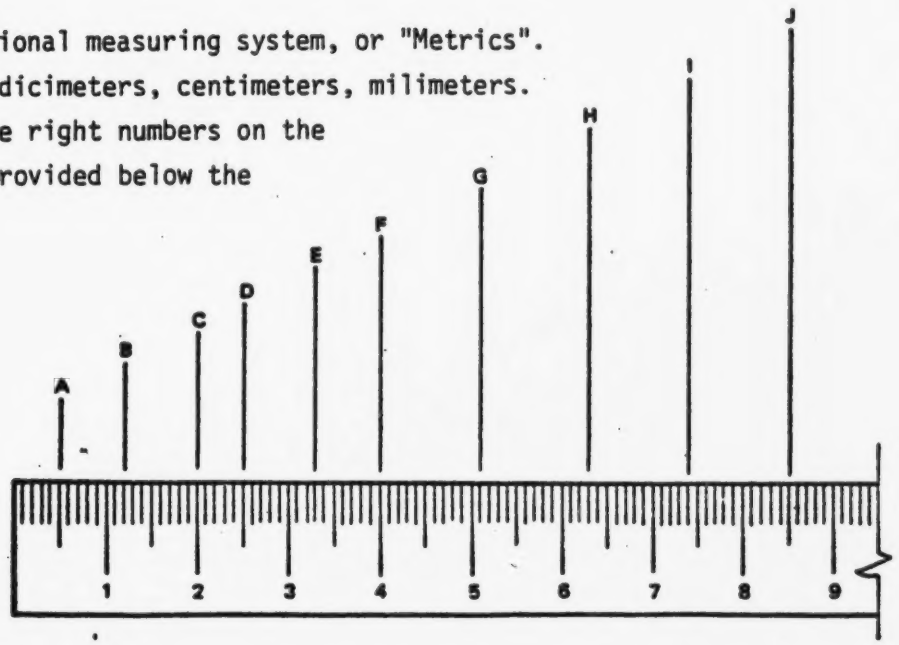


A. _____ B. _____ C. _____ D. _____ E. _____

F. _____ G. _____ H. _____ I. _____ J. _____

K. _____ L. _____ M. _____ N. _____ O. _____

International measuring system, or "Metrics".
Meters, dicimeters, centimeters, milimeters.
Place the right numbers on the spaces provided below the ruler.



A. _____ B. _____ C. _____ D. _____ E. _____

SKILLS CHECKLIST
General Mathematics

Add

a) 4327
64
295
+ 13

b) 36+1045+909

c) $89,405.62
2,006.30
+ 50.79

d) $620.04+$148.99

Subtract

a) 870
-374

b) 11065-4825

c) $301.05
- 196.48

d) $1293.14-$64.11

Multiply

a) 259
x 67

b) 5014 x 108

c) $433.50
x 13.02

d) $29.40 x 15

Divide

a) 43 | 26918

b) 71838 ÷ 307

c) 21 | $39.90

d) $18.48
.22

SKILLS CHECKLIST

Add

Fractions

a) $\frac{3}{12} + \frac{5}{12}$

b) $1\frac{15}{27} + 3\frac{12}{27}$

c) $\frac{4}{11} + \frac{2}{5}$

d) $2\frac{7}{8} + 1\frac{3}{4}$

Subtract

a) $\frac{42}{65} - \frac{11}{65}$

b) $3\frac{4}{5} - 2\frac{1}{5}$

c) $\frac{5}{12} - \frac{3}{8}$

d) $4\frac{1}{5} - 2\frac{2}{3}$

Perform the indicated calculations

a) $\frac{3}{4} \times \frac{1}{4} =$

b) $4\frac{2}{3} \times \frac{3}{5} =$

c) $\frac{1}{2} \div \frac{3}{4} =$

d) $2\frac{9}{14} \div 1\frac{3}{7} =$

Reduce the following fractions to their simplest form

a) $\frac{18}{24} =$

b) $\frac{30}{125} =$

c) $\frac{56}{87} =$

Write the following fractions as percents

a) $\frac{3}{4} =$ _____

b) $\frac{5}{8} =$ _____

SKILLS SCECKLIST

Decimals

Perform the indicated calculations

a) $\begin{array}{r} 36.042 \\ +\ 5.11 \\ \hline \end{array}$

b) $217.130 + 4.6 + .0083 =$

c) $\begin{array}{r} 12.563 \\ -\ 4.27 \\ \hline \end{array}$

d) $1.563 \div .931 =$

Perform the indicated calculations

a) $\begin{array}{r} .032 \\ \times\ 4.21 \\ \hline \end{array}$

b) 91.101×2.02

c) $3.2\overline{)\,.096}$

d) $\begin{array}{r} 1.98 \\ .36 \\ \hline \end{array}$

Arrange the following in order from smallest to largest:

95.47, 954.7, .9547, .09547, 9.547

smallest _____ _____ _____ _____ _____ largest

Write in decimal form

a) Twenty-six hundredths _____

b) Fourteen thousandths _____

Write the following as words

a) 210.30 _____

b) 11.08 _____

Complete the following table

	Fraction		Decimal
a)	$\frac{3}{5}$	=	
b)	$\frac{4}{32}$	=	
c)		=	.25
d)		=	.80

Complete the following table

	Decimal		Percent
a)	.56	=	
b)	2.30	=	
c)		=	40.%
d)		=	.60%

FRACTIONS- Skills Checklist for

CONSTRUCTION CLASS

Add-

a) $\begin{array}{r} \frac{3}{12} \\ +\ \frac{5}{12} \\ \hline \end{array}$

b) $\begin{array}{r} 1\ \frac{15}{27} \\ +\ 3\ \frac{12}{27} \\ \hline \end{array}$

c) $\begin{array}{r} \frac{4}{11} \\ +\ \frac{2}{5} \\ \hline \end{array}$

d) $\begin{array}{r} 2\ \frac{7}{8} \\ +\ 1\ \frac{3}{4} \\ \hline \end{array}$

Subtract-

a) $\begin{array}{r} \frac{42}{65} \\ -\ \frac{11}{65} \\ \hline \end{array}$

b) $\begin{array}{r} 3\ \frac{4}{5} \\ -\ 2\ \frac{1}{5} \\ \hline \end{array}$

c) $\begin{array}{r} \frac{5}{12} \\ -\ \frac{3}{8} \\ \hline \end{array}$

d) $\begin{array}{r} 4\ \frac{1}{5} \\ -\ 2\ \frac{2}{3} \\ \hline \end{array}$

DEALING WITH FEET AND INCHES

Add-

a) 16' 8" + 7' 3"

b) 24' 10" + 5' 9"

c) 32' 5" + 11' 11"

d) 64' 4" + 18' 10"

Subtract-

a) 10' 10" - 5' 5"

b) 12' 8" - 2' 9"

c) 36' 5" - 15' 9"

d) 42' 8" - 24' 11"

Reduce the following fractions to simplest form-

a) $\frac{24}{32}$

b) $\frac{18}{32}$

c) $\frac{14}{16}$

Math Skills Check- Overall Name-_____

class-_____

Period-_____

GENERAL MATH

Add: 547+6916=_____ Subtract: 12,452-987=_____

366+1045+99=_____ 9000-7587=_____

Multiply: 128 X 5014=_____ Divide: 26,918 ÷ 43 =_____

209 X 6078=_____ 71,838 ÷ 307 =_____

FRACTIONS

Add: $\frac{4}{11} + \frac{2}{5} =$ _____ $2\frac{7}{8} + 1\frac{3}{4} =$ _____ Subtract: $\frac{5}{12} - \frac{3}{8} =$ _____ $4\frac{1}{5} - 2\frac{2}{3} =$ _____

Multiply: $\frac{3}{4} \times \frac{1}{4} =$ _____ $4\frac{2}{3} \times \frac{3}{5} =$ _____ Divide: $\frac{1}{4} \div \frac{1}{2} =$ _____ $\frac{1}{2} \div \frac{3}{4} =$ _____

Reduce to lowest terms: $\frac{24}{32} =$ _____ $\frac{18}{32} =$ _____ $\frac{14}{16} =$ _____ $\frac{375}{1000} =$ _____ $\frac{6}{8} =$ _____ $\frac{625}{1000} =$ _____

Convert to decimal number: $\frac{3}{4} =$ _____ $\frac{5}{8} =$ _____ $\frac{11}{16} =$ _____ $\frac{3}{8} =$ _____ $\frac{15}{16} =$ _____ $\frac{4}{32} =$ _____

DECIMALS

Add: 217.130 + 4.6 + .0083 =_____ Subtract: 1.563 − .931 =_____

36.042 + 5.11 =_____ 12.563 − 4.27 =_____

Multiply: .032 X 4.21 =_____ Divide: .096 ÷ 3.2 =_____

2.02 X 91.101 =_____ 1.98 ÷ .36 =_____

Write in decimal form: twenty six hundredths=_____ fourteen thousandths=_____

two hundred fifty thousandths=_____ five hundred ten and ten thousandths=_____

Convert these decimal numbers to fractions and reduce to lowest terms:

1.5 =_____ .25 =_____ .625 =_____ .375 =_____ .80 =_____ .125 =_____

FEET AND INCHES

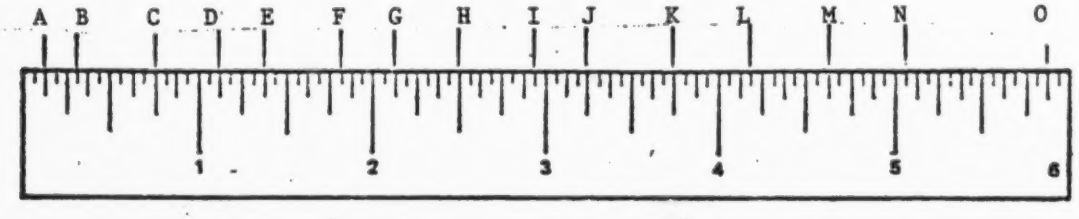
Add: 32' 5" + 11' 11" =_____ Subtract: 36' 5" - 15' 9" =_____

6' 2" + 2' 8" =_____ 4' 2" - 2' 10" =_____

Multiply: 2' 2" X 4 =_____ Divide: 4' 8" ÷ 4 =_____

1' 8" X 3 =_____ 2' 7" ÷ 2 =_____

AMERICAN STANDARD MEASURING SYSTEM: (place answers in blanks below)



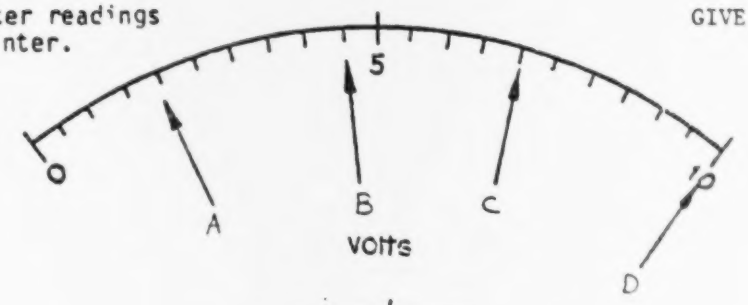
A._____ B._____ C._____ D._____ E._____

F._____ G._____ H._____ I._____ J._____

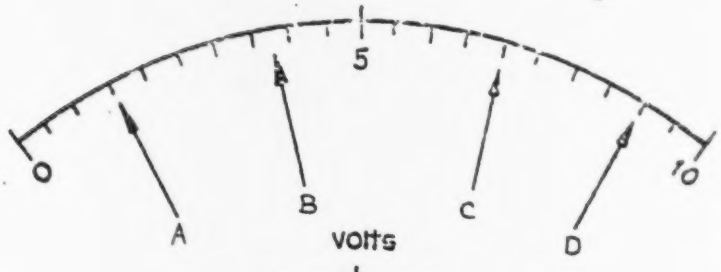
ELECTRONICS I SKILLS CHECK (Reading Scales)

Give the meter readings for each pointer.

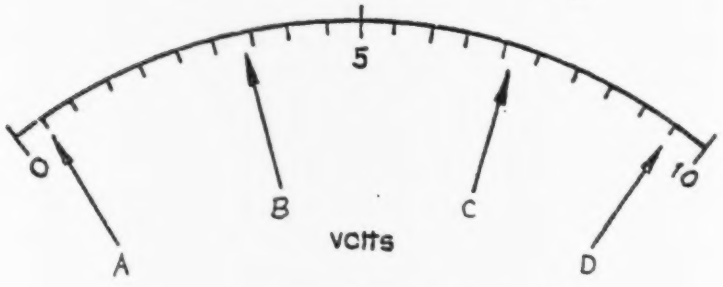
GIVE ALL ANSWERS IN DECIMAL FORM.



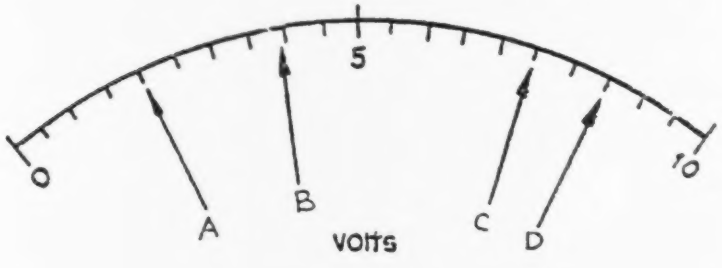
1. a._____
   b._____
   c._____
   d._____



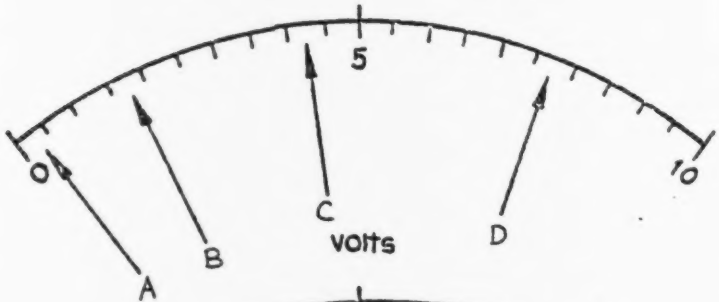
2. a._____
   b._____
   c._____
   d._____



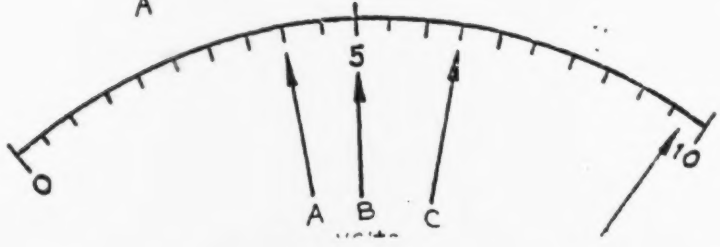
3. a._____
   b._____
   c._____
   d._____



4. a._____
   b._____
   c._____
   d._____



5. a._____
   b._____
   c._____
   d._____



6. a._____
   b._____
   c._____
   d._____

Skills Checklist in Electronics (Math)

General Math:

Add- 4327 / 64 / 295 / + 13

Subtract- 870 / -374

Multiply- 259 / x67

Divide- $43\overline{)26918}$

Decimals:

A. Add-

217.130 + 4.6 + .0083=

B. Subtract-

1.563 - .931=

C. Multiply-

.032 X 4.21=

D. Divide-

.096 $\div$ 3.2=

E. Write these numbers in decimal form-

Twenty six hundredths-_____

Fourteen thousandths-_____

Complete the following table-

fraction		decimal
$\frac{3}{5}$	=	_____
$\frac{4}{32}$	=	_____
_____	=	.25
_____	=	.8

Complete the following problems- (show your work)

10,000
X.0001

(10 X 10 X 10)(10) =

.1 X 1 X 10 X 100 X .0001=

SKILLS CHECKLIST- READING COMPREHENSION- MACHINE SHOP

Like stone and wood, steel has a grain structure. With the naked eye we can see the grain in a polished piece of wood; with steel, however, the grain structure must be magnified many times to be visible. In order to see and study grains in steel, we prepare a sample by giving its surface a very high polish. After the sample is polished, it is etched in acid. The action of the acid makes the grain visible under a powerful microscope.

The grain structure of steel is composed of iron and carbon. Some of the iron and carbon in steel, forms a chemical compound. The iron that does not go into a compound with carbon also has its part in grain formation. The grains of steel we find then are composed of alternate layers of almost pure iron and the iron and carbon that has joined chemically to form a compound.

When steel is in a molten state, there is no grain structure. As the steel cools and begins to harden, grains start to grow around the edges of the mold. As the metal continues to cool, grains continue to form until the metal all becomes solid. The grain structure of a piece of steel may be very coarse or very fine. Good quality tools have a fine grain structure.

The grain size in steel can be altered and controlled by several methods. Hot forging or hammering while hot, will refine the grain structure, as will addition of certain elements. Heat treating operations will also give the grain structure desired.

Tools and other machine parts are hardened to increase their strength and wear resistance. The properties of all steels may be changed very markedly by heating and cooling under definite, controlled conditions. The object of heat treatment is to make the steel better suited, structurally and physically, for some specific application. The most important heat treatment is that of hardening. In heat treating steel, the temperature to which the steel is heated is very important since the metal must be heated above a certain temperature before it will become hardened.

Skills Checklist- Machine Shop- Reading Comprehension Questions.

Like stone and wood, steel has a _____ structure. We cannot see this structure with the naked eye, we need to use a _____.
How do we prepare the surface of a piece of steel in order to see this stucture?

_____

_____

_____

The grain in steel is composed of _____and_____.
What are the grain layers composed of in steel?

_____

_____

When steel is in a molten state there is still a grain structure present? (T F)

Grains grow in the steel as it hardens. The grains grow from the inside out. (T F)

The grain of steel can be coarse or fine.(T F)

Good quality tools have coarse grains. (T F)

What are two ways of altering or controlling grain in steel?_____

_____

_____

Why do we harden tools?_____

_____

The most important heat treatment is that of _____.

Why is the temperature to which the steel is heated so important in heat treating?

_____

_____

_____

If a source of electrical voltage is connected to a device, such as a lamp, by means of copper wires, the electrons will flow or be conducted from the negative terminal of the source, through the lamp, and back to the positive terminal of the source. These copper wires are the path or road along which will flow the electric current. The wire is called a CONDUCTOR. Some materials are good conductors of electricity. Materials which have a large number of free electrons are considered good conductors. The actual conduction is accomplished by transferring electrons from one atom to the next in the conductor. One may visualize this flow by assuming that a piece of copper wire is neutral. If an electron is forced onto one end of the wire, an electron is forced off from the other end. The original electron did not flow through the conductor, yet the energy was transferred by the enteraction between the electrons in the conductor. The actual transfer of electrical energy has been accurately measured and approaches the speed of light or 186,000miles per second. In terms of the metric system, this would be 300,000 kilometers per second or 300,000,000 meters per second.

Copper conductors are used in most electrical circuits. Copper is an excellent conductor. Silver is even better than copper, but it is too expensive for general use. Many high power lines use aluminum for added stregth and light weight. Brass, zinc, and iron are also fair conductors of electricity.

Materials which have only a few free electons do not readily conduct electrons and are called INSULATORS. Insulation is used on wires to protect personnel from accidental contact with circuits and to avoid electrical contact between wires and supporting devices. Common materials used for insulation are rubber glass, air, bakelite, mica and asbestos. It is apparent then, that some materials resist the flow of electrons, while others have less resistance to the flow of electrons. This is true and resistance must always be considered as an important characteristic of electrical circuits.

ELECTRONICS ONE SKILLS CHECK READING COMPREHENSION QUESTIONS

Explain the diference between conductors and insulators- (use complete sentences)

_____

_____

_____

_____

Explain the process of conduction of electricity along a wire-(use complete sentences)

_____

_____

_____

_____

_____

Name three insulators-_____

Name three conductors-_____

(T F) Silver is not as good a conductor as copper or aluminum.

(T F) Materials which have very few free electons are the best conductors.

(T F) The same electron flows all the way through the wire to form the electrical current.

(T F) Asbestos is an exellent conductor.

(T F) Resistance must always be considered important in electrical circuits.

How fast does the current flow in the wire?_____

(T F) All materials have about the same resistance to the flow of current.

SKILLS CHECK FOR WELDING (Reading)

An individual who desires to become a skilled welder should have a knowledge of welding that goes beyond the learning of hand techniques. A skilled welder should have a knowledge of the effects of heat on the grain structure of metal. Metal properties controlled by the addition of certain alloying elements to improve the metal can easily be destroyed by the careless application of heat. The welder must exercise care so that the grain structure of the metal is not completely changed by the welding operation, thus making the part unfit for its original use. Welding can affect the chemical, physical, and mechanical properties of the metal. It is for this reason that a great deal of importance is placed upon the welder's knowledge of metallurgy.

In learning welding skills, an understanding of the mechanical properties of metals is most important. The mechanical properties of a metal can be described as the reaction of a material to mechanical usage. If the mechanical properties of a metal are known, a product can be constructed that will meet most engineering specifications. As a result a safe and sound structure can be constructed.

The terms that follow describe some of the significant mechanical properties that the welder should be familiar with in order to do a successful job of welding fabrication.

HARDNESS may be defined as resistance to penetration.

HARDENABILITY is the ability of a metal to be hardened by thermal or mechanical means.

BRITTLENESS refers to the ease with which a metal will crack or break apart without noticeable deformation.

DUCTILITY is the ability of a metal to be twisted, drawn out, bent, or changed in shape without breaking.

TOUGHNESS is the property that allows a metal to withstand forces, sudden shock, or bends without fracturing

STRENGTH is the property of a metal to resist deformation. Common types of strength are tensile, compressive, shear and torsional.

Tensile strength refers to the property of a material which resists forces applied to pull metal apart.

Compressive strength is the property of a material to resist being crushed.

Shear strength of a material is a measure of how well a part can withstand forces acting to cut or slice it apart.

Torsional strength is the property of a material to withstand a twisting force.

NAME_____

SKILLS CHECK FOR WELDING (Questions)

True/False - Answer the following statements according to what you have just read.

_____ 1. Good hand techniques are all you need to be a skilled welder.

_____ 2. Heat has a definite effect upon the grain structure of metal.

_____ 3. A welding operation can change the grain structure of metal.

_____ 4. Heat has no effect on the properties of metal which are controlled by adding alloying elements.

_____ 5. Welding can affect not only the mechanical properties of metal, but the chemical and physical properties as well..

_____ 6. "Mechanical Properties" of metal can be described as its reaction to being in mechanical use.

_____ 7. The safety of a structure has little to do with the mechanical properties of the materials used to construct it.

Define the following terms using complete sentences.

Hardness:

Brittleness:

Ductility:

Tensile Strength:

Compressive Strength:

Torsional Strength:

Oil is the most common fluid used to provide lubrication. For many years, lubricating oil has been made or refined from crude petroleum pumped from oil wells. Lubricating oil is only one of the many products refined from crude petroleum. Others include gasoline, kerosene and fuel oil. Oil refined from crude petroleum sometimes is called mineral oil or petroleum oil. Oil also may be made from nonpetroleum sources. This kind of oil is called synthetic oil. Oil used in a small engine must have the correct viscosity and service rating for that engine.

Viscosity describes the thickness or thinness of fluid. A common term for viscosity is body. A fluid with a high viscosity is said to have a heavy body. An example of fluid with a high viscosity is the thick lubricant used in some standard transmissions and rear axles. A low-viscosity fluid is one with a light body. The viscosity of fluid determines how freely it flows. Low-viscosity fluids flow very freely. High viscosity fluids flow sluggishly. Oils used in engines must have a viscosity which allows them to flow freely under cold conditions but which has enough body to provide a coating during times of high temperature.

The Society of Automotive Engineers (SAE) has set up standards for oil viscosity. Thin oil receives a low viscosity number, such as SAE 20. Thicker oil receives a higher number such as SAE 40, or SAE 50. The viscosity number is stamped on top of the oil can. The operator's manual for the engine usually specifies what viscosity should be used.

Some engines used SAE 30 in the summer and SAE 20 or 10 or 5 in the winter. For this reason companies sell what is called a multiple-viscosity oil, such as SAE 10-40. This oil flows freely like SAE 10 when the weather is cold, but protects like SAE 40 when it is hot. An engine operated in different climates needs multiple-viscosity oil. A viscosity rating that has a W after it, such as SAE 20W, means the oil has been tested at 0°F and is rated for cold-temperature operation.

Just as important as viscosity is an engine oil's service rating, printed on the side of the oil can. The service ratings, set up by the American Petroleum Institute (API), are a measure of how well the oil holds up under severe wear-and-tear. If the oil does not do well, it gets a low rating or classification; it it does well, it get a high one. The categories are SA (lowest), SB, SC, SD, SE, (highest).

Small engines may use oil of a lower classification than automobiles. The engine operators manual usually will specify what service classification should be used. A higher classification can always be substituded, but never a lower one.

Reading Questions - Skills Checklist

Power Mechanics

Oil Made from non-petroleum sources is called_____

Besides oil what three other things do we get from crued petroleum?_____

_____ _____

What does "viscosity" mean?_____

T F High viscosity means it will flow freely.

T F Low viscosity means it will flow sluggishly.

T F High viscosity means it will flow sluggishly.

T F Low viscosity means it will flow freely.

SEA 20 oil is (thick or thin).

SEA 50 oil is (thick or thin).

A "W" after the SEA number means;_____

T F The service rating SA is the highest.

T F The service rating SE is the highest.

T F The service rating SA is the lowest.

T F The service rating SE is the lowest.

The _____ _____ will specify what service rating should be used in your engine.

A _____ rating can be substituted but never a _____ one.

Skills Checklist for Health Occupationas I

Reading Selection

A chemical reaction occurs when two or more substances react with one another to form a new substance. These chemical reactions involve energy. Most chemical reactions release energy in the form of heat; however, some reactions release energy as light or electricity, and some heat is also given off in these reactions. The type of chemical reaction in which heat is released is called exothermic. The release of energy in an exothermic reaction may occur slowly as it does in reactions in our body, or the energy release can be explosive, such as a blast of dynamite. There are some reactions, however, in which energy must be supplied in the form of heat, light or electricity. These are called endothermic reactions.

There are many factors that influence the speed of a chemical reaction. Obviously this is of practical importance to a chemist in a laboratory, but it is also of considerable importance to us. For example, disinfectants and antiseptics destroy bacteria by chemical reactions. We need to know how much time is required for a reaction in order to accomplish the desired effect.

Chemical reactions occur more rapidly when the temperature is increased. Refrigeration helps preserve our food because it retards the chemical reactions in food. Our body temperature helps to regulate the speed of chemical reactions within our bodies.

A catalyst is an agent that influences the speed of a chemical reaction. As a result of the action of a catalyst the speed of a chemical reaction may be increased or retarded, but the catalyst itself remains unchanged.

Hydrogen peroxide (H_2O_2) is an effective cleansing agent because it liberates oxygen. When you apply hydrogen peroxide to a wound you will see it bubble; this is the oxygen being liberated and cleansing the wound. To prevent the decomposition of hydrogen peroxide in the bottle the manufacturer adds a little acetanilid to the solution. This acetanilid is a catalyst.

Digestive enzymes are catalysts. Bread cannot be utilized by our body until it is broken down to a very simple chemical form. The speed of this process is enhanced by digestive enzymes.

Not only is the chemistry of digestion accompliched by enzymes but all chemical reactions in the body are influence by specific enzymes, the biological catalysts. Since internal body heat must remain relatively stable, the speed of these chemical reactions is chiefly dependent on enzymes.

The speed of a chemical reaction is directly propertional to the concentration of the reacting substances. If we use the example of an antiseptic, we might assume that the stronger the antiseptic, the more rapidly the bacteria are destroyed. Although this may be true, there are other important condiderations.If we are using the antiseptic on the skin, we must be sure that a strong concentration will not harm the skin. A lower concentration may take longer to destroy the bacteria but be safer for use on the skin.

Skills Checklist for Heasth Occupations I

Reading Selection Questions

1. A _____ _____ occurs when two or more substances react with one another to form a new substance.
2. The type of chemical reaction in which heat is released is called _____.
3. The type of chemical reaction in which heat is supplied is called _____.
4. Chemical reactions occur more rapidy when the _____ is increased.
5. Chemical reactions can be slowed down or speeded up by adding a _____.
6. Digestive _____ are catalysts.
7. Refrgeration helps to preserve our food because it _____ the chemecal reactions within food.
8. _____ and _____ destroy bacteria by chemical reations.
9. Bread cannot be utilyzed by our body until it is _____ _____ to a very simple chemical form.
10. All chemical reactions in the body are influenced by specific inzyces, the _____ _____.
11. Since enternal body heat must remain relatively stable, the speed of these chemical reactions is chiefly dependent on _____.
12. Which of the following is not a factor in the speed of chemical reactions-

_____ A. Concentration, B. Enzyme action, C. Catalysts, D. None

13. Biological Catalysts are-

_____ A. Chemical reactions, B. Specific enzymes, C. Antisepics, D. Hydrogen Peroxide

14. The term exothermic means-

_____ A. Gathering energy in, B. Bubbling reactions, C. Releasing energy, D. Speed of reaction.

15. The term endothermic means-

_____ A. Releasing energy, B. Energy supplied, C. Digestion, D. Concentration

Study the chart and read the selection.

TABLE 10-1

NORMAL TEMPERATURE, PULSE RATE, AND BREATHING RATE OF FARM ANIMALS

Animal	Normal Rectal Temperature		Normal Pulse Rate	Normal Breathing Rate
	Average	Range		
	(°F)	(°F)	(min)	(min)
Cattle	101.5	100.4-102.8	60-70	10-30
Sheep	102.3	100.9-103.8	70-80	12-20
Goats	103.8	101.7-105.3	70-80	12-20
Swine	102.6	102 -103.6	60-80	8-13
Horses	100.5	99 -100.8	32-44	8-16
Poultry	106.0	105 -107	200-400	15-36

Table 10 gives the normal temperature, pulse rate, and breathing rate of farm animals. In general, any marked and persistent deviations from these normals may be looked upon as a sign of animal ill health.

Every stockman should provide himself with an animal thermometer, which is heavier and more rugged than the ordinary human thermometer. The temperature is measured by inserting the thermometer full length in the rectum, where it should be left a minimum of three minutes. Prior to inserting the thermometer, a long string should be tied to the end to aid in retrieving it.

In general, infectious diseases are ushered in with a rise in body temperature, but it must be remembered that body temperature is affected by stable or outside temperature exercise, excitement, etc.

The pulse rate indicates the rapidity of the heart action. The pulse of different farm animals is taken at the following body areas: cattle, either on the outside of the jaw just above its lower border, on the soft place immediately above the inner dewclaw, or just above the hock joint; sheep and swine, on the inside of the thigh where the femoral artery comes in close proximity to the skin; and horse, either at the margin of the jaw where an artery winds around from the inner side, at the inside of the elbow, or under the tail. It should be remembered that the younger, the smaller and the more nervous the animal, the higher the pulse rate. Also, the pulse rate increases with exercise, excitement, digestion, and high outside temperature.

The breathing rate can be determined by placing the hand on the flank, by observing the rise and fall of the flanks, or, in the winter, by watching the breath condensate in coming from the nostrils. Rapid breathing due to recent exercise or excitement should not be confused with disease.

AGRICULTURE SKILLS CHECLIST - READING QUESTIONS

T / F Generally speaking the smaller the animal the slower the pulse rate.

T / F Generally speaking the larger the animal the higher the average temperature.

T / F A pulse rate of 52 would be slightly high for a resting horse.

T / F A temperature of 103 is within the normal range for sheep.

T / F A temperature of 105 is within the normal range for cattle.

T / F A pulse rate of 80 is within the normal range for cattle.

T / F A temperature of 99 would be withing the normal range for a pig.

T / F A breathing rate of 15 would be too low for a sheep and would indicate illness.

T / F A breathing rate of 20 would be slightly high for a resting horse.

T / F Body temperature is affected by the temperature of the environment.

T / F Body temperature, pulse rate, and breathing rate are all affected by exercise.

What is the proceedure for taking the temperature of a large animal?

_____

_____

_____

What are the three ways of determining the breathing rate of a large animal?

1 _____

2 _____

3 _____

A rise in body temperature which is inapropriate for the animals environment and activity level could be an indication of _____

Pulserate in a calf will be (faster/slower) that its mother.

APPENDIX C-

Daily Lesson Plans for Aides

In this appendix are examples of daily lesson plans for use with peer tutors or student aides. The Author offers this concept even though ideally one should not have to resort to using non-professional help when teaching D and H students.

These lesson plans were used in a situation where the author had student aides working with TMH students in both a wood-working and a welding class. They reflect a lower level of functioning than would be expected of the more "normal" population. Oral testing was used with the TMH students and less complicated projects, of course, were attempted.

Testing proceedure and project design can be modified to fit any D and H condition within any vocational class' curriculum. These are merely examples to illustrate the earlier discussion regarding lesson plans for student sides and peer tutors.

irst 4 weeks of first emester. rientation to shop, ool room, and bench. tudents should learn heir place at the ench. Mon.	Tool Identification- Hand tools in tool room. students should learn to identify and name the following tools- Hammer (ball-peen and claw) saw (rip, cross-cut and back) tue.	plane (jack and block) screw driver (phillips and standard) drill (hand drill) chisel square (tri-square, combination aquare, carpenters aquare) Wed.	students should not be allowed to wander in shop. If not with tutor they should be at their place on the bench. Do not allow horseplay. Thur.	Demonstrate proper use of rip and cros cut saw on scrap p Have students draw straight, square li on scrap pine and saw on line. Fri
his will take a lot of ractise, so stay with he student to assist im/her with the technique of sawing straight line. Mon.	Tue.	Demonstrate proper use of jack plane on face and edge of scrap pine. Have students draw straight and square lines on wood and plane to lines. Wed.	This will take even more practice and guidance than the saw exercise did so stay with the student and assist with correct technique in planing face and edge. Thur.	Fri
emonstrate proper use f block plane on scrap ine. Have students raw straight and quare lines on scrap ine and have them ractice the use of the lock plane. Again you ill need to quide the tudent in the proper Mon.	technique and stay with him/her to make sure he/she is doing it right. It takes lots of patience and practice for these students to perform well on these tasks. Tue.	Reveiw tool room today also. Wed.	Catch up day. (use catch up days to catch up on assignments or reveiw past assignments) Thur.	Catch up day. Fri
tart first project- Book shelf (see drawing for plan)	Wherever possible in working on projects students should be doing their own work but you should be there to guide and assist them at all times.	The bookshelf project combines the uses of the rip and crosscut saws and the planes which we have been working on, and it introduces the use of the back saw in the miter g e and the	router plane. Particular care should be taken when useing these new tools so that the finished product is not ruined. Take your time and if you have to make the	student start over a few times thats OK.

Mon.	Tue.	Wed.	Thur.	Fri.
First 4 weeks of second semester- Orientation to power tools. Teach the names of all hand and stationary power tools. Work one on one.	Students should be at his or her place at bench if not with tutor. Never allow horseplay	Power too orientation-Start with circular saw-teach the names of the parts of the machine. Blade, safety guards, fence, miter guage, blade hight wheel, blade angle wheel, on/off switch, etc.-	Power tool orientation Make students say names clearly so you can understand them.	Teach safety rules circled on circular saw safety rule she You can use scrap pine to demonstrate safety rules but do not allow students make cuts yet.
Circular saw safety rules.	When you are sure the student knows and understands circular saw safety rules you can let student make some cuts while you control the wood. Always watch students fingers while making cuts	When you feel student is ready let him/her make alone but under strict supervision.	Catch up day- use catch up days to complete assignments or to review past assignments	Catch up day.
Teach names of parts of jointer-guard, fence, blade, blade hight adjustment	Teach safety rules circled on jointer safety rules sheet. You can use scrap pine to demonstrate the do's and don'ts but do not let student operate machine yet.	Guide student through the proper use of the jointer. Students must practice many times on power tools to get it right and you must guide them and watch them at all times.	Practice on circular saw and jointer.	catch up day.
Teach the names of the parts of the planer-bed, bed hight adjustment locking wheel, bed hight gauge, etc.	teach safety rules circled on planer safety sheet. demonstrate,with scrap, the proper use of the planer and make sure student knows set-up proceedure steps--------	1. turn on blower 2. pull out air stop 3. set bed hight at thickest part of wood. 4. always plane with the grain. 5. minimum sizes	catch up day.	catch up day.

FINAL TEST ON TOOL IDENTIFICATION (POWER TOOLS) IN FINNISH CONSTRUCTION

Directions; Point to or hold up the tool indicated on the test and say "What's the name of this tool?" Write down what the student says in the space provided.

Hr ' tools-

DRILL _____

JIG SAW _____

ROUTER _____

BELT SANDER _____

ORBITAL SANDER _____

Stationary tools-

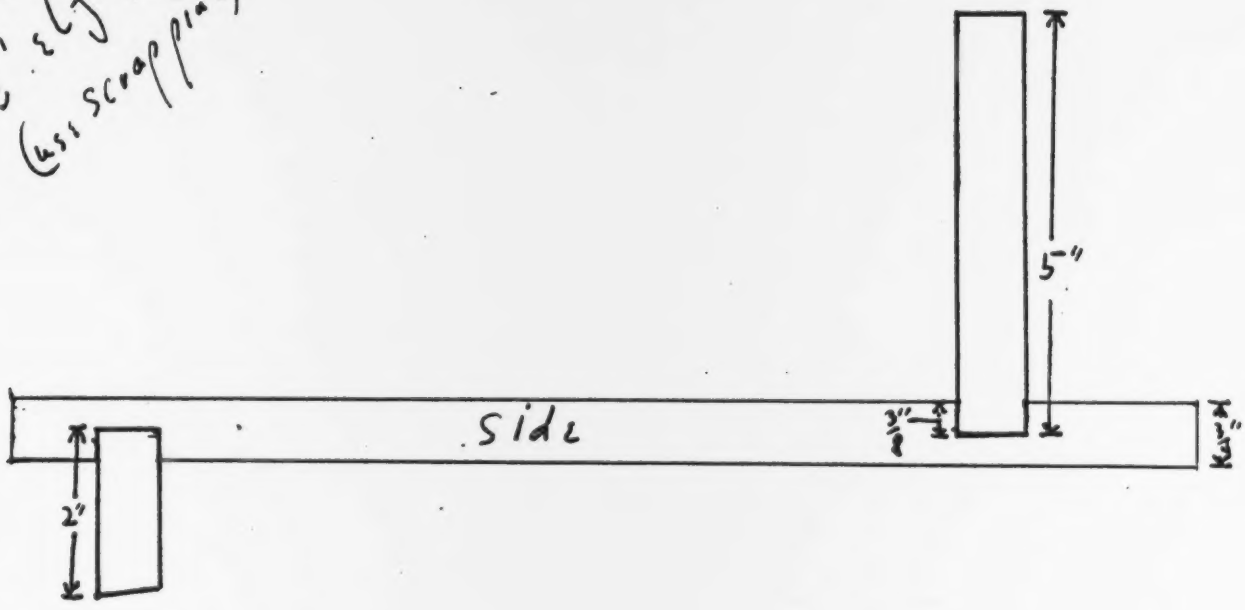
JOINTER _____

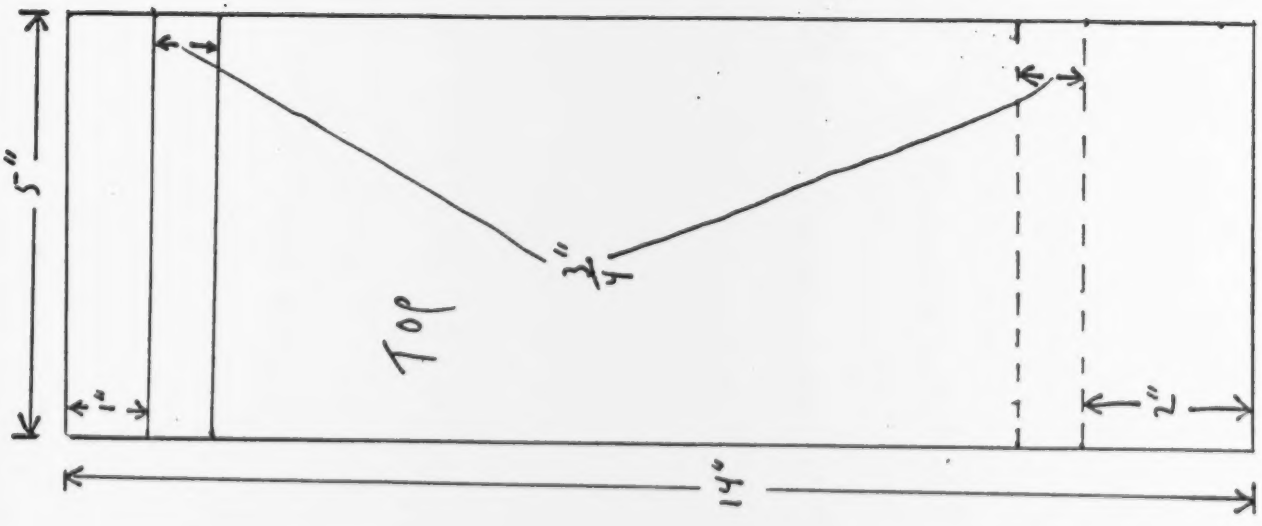
CIRCULAR SAW _____

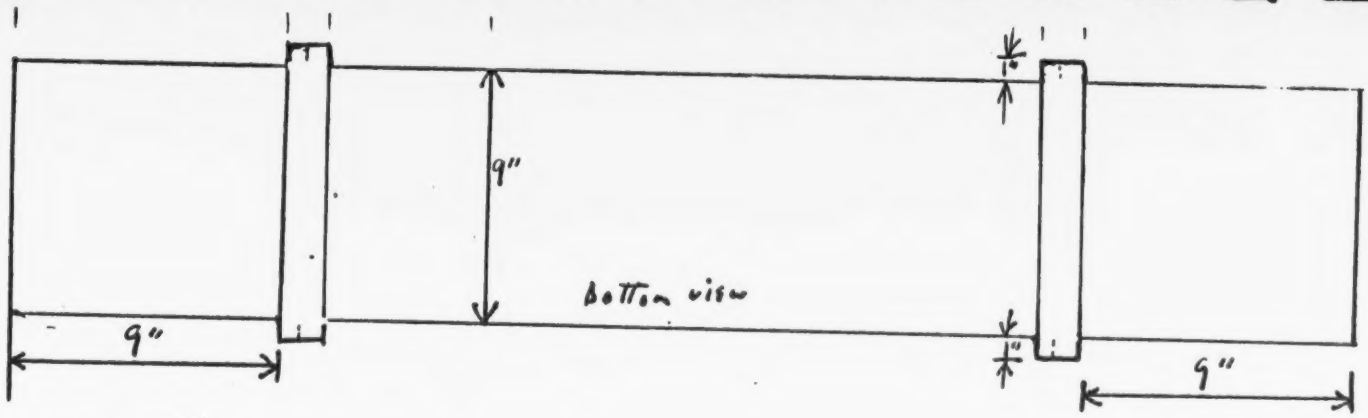
PLANER _____

BAND SAW _____

Book shelf
(use scrap pine)





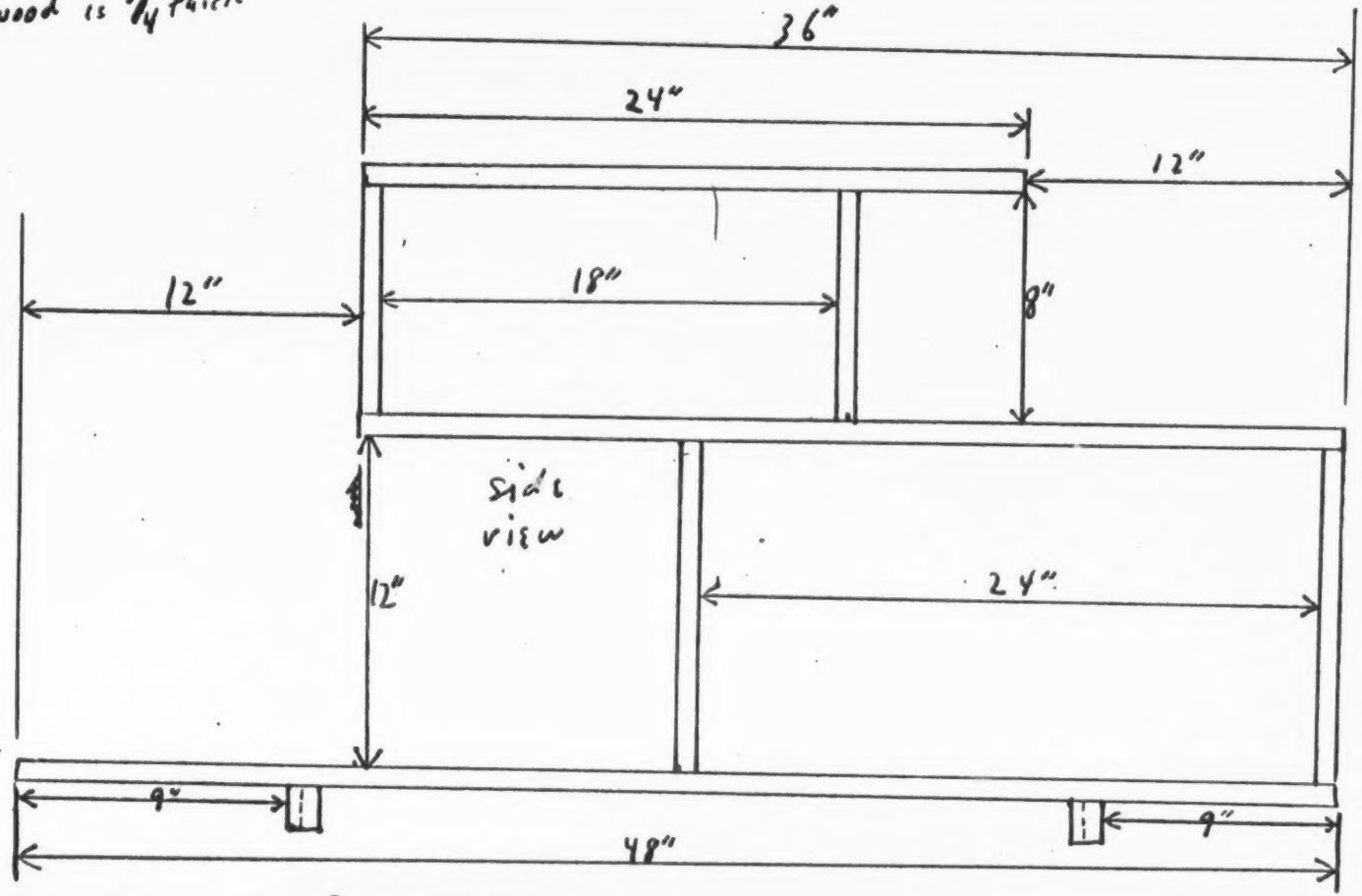


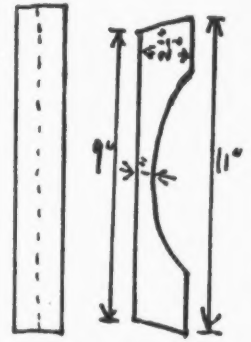
use three dowels on all joints

plus glue on surfaces

clamp well

all wood is 3/4" thick





LEGS
Laminate 2 pcs. together - then shape

Book Table Project

FIRST SEMESTER FINAL TEST ON TOOL IDENTIFICATION (HAND TOOLS) IN FINNISH CONSTRUCTION

Directions; Point to tool inticated on test and say "what's the name of this tool?". If student says the general name but not the specific name (savs "Hammer" not Ball Peen Hammer), then say "What kind of -------- is this?" Write down the answer the student gives in the space provided. Do not give any more promptings than what is given here.

BACK SAW _____

RIP SAW _____

CROSSCUT SAW _____

JACK PLANE _____

BLOCK PLANE _____

BALL PEEN
HAMMER _____

CLAW HAMMER _____

DRILL _____

CHISEL _____

PHILLIPS HEAD
SCREW DRIVER _____

SI. JARD
SCREW DRIVER _____

TRI SQUARE _____

COMBINATION
SQUARE _____

CARPENTERS
SQUARE _____

First four weeks of second semester. This semester you will be working on the oxy-acetylene equipment. Read over the first 6 pages of the O/A Special Book.	The book is written in simple language. Take your time going over it with the student. Get examples of the articles discussed so the student can handle them. A good understanding of the operation of the O/A welding process will overcome a lot of fear when you start to work.	Be sure the student can name or point to all the articles that you study. Take two or three days to go over these pages with student so that he/she understands where the gas comes from, where it goes and what happens to it.	Allow the student to watch all demonstrations in the classroom. Use the test to study the names of the parts of the O/A equipment.	Study equipment identification.
This week you will work on setting up the O/A equipment. Have the student get all equipment and name it. Start demonstrating how to set up the welder properly, with the right pounds of presure for the tip being used.	Have the student name each part of equipment as it is set up. Teach the sequence of setting up the tanks. Teach the sequence of bleading off the tanks when finnished.	Take the whole week to teach the setting up of the tanks and make sure before going on that the student can name the parts and can set up the tanks with the proper presure without prompting from you	Tank set up.	Tank set up.
Continue having the student set up the equipment himself for the rest of the year. This week work on the flames. Look on page 8 of the special book and teach the difference between the right and wrong ace. flames.	Continue teaching the ace. flames today. Do this until the student can set up the proper ace. flame alone.	When the student can set up the proper ace. flame go on to page 9 of the special book. Explain what happens when Ox. is added to the ace. flame. Show the differences between the oxidizeing, carborizing, and neutral flame.	Teach the student how to set up each of the three kinds of O/A flames. Go over this until the student can do it alone.	Teach what each fla is good for.
This week work on chasing puddles. Turn to page 12 in the special handbook and explain the process of puddling, page 13 will also be of interest.	At this point the student is entering a dangerous phase of instruction so you should always be with the student from now on when the student is working with this equipment.	Chase puddles. Teach the student that if the flame starts to pop the flame must be readjusted starting with the acetylene flame.	Chase puddles. You may have to guide the students hands at first until he/she gets the idea of the motion this operation requires.	Chase puddles.

Second four weeks of second semester This week again work on chasing puddles. when the student is doing this operation well you can move on to an outside corner fusion weld.	You will have to help hold the pieces of metal while the student tacks them together. Teach the fuston weld just like the puddles. You may have to guide the students hands at first.	Fusion weld. NEVER LEAVE THE STUDENT WHEN O/A WELDING.	Fusion Weld.	Fusion Weld.
If the student is doing a good job of running a puddle and a fusion weld without filler rod then move on to the next exercise. Puddles with filler.	Teach the student how to add filler rod to the puddle to build up the crown of the bead. Go over page 14 with student.	Be sure you are teaching the proper angles of both the torch and the filler rod. a good way to start on this is to add the filler rod yourself while the student is running the torch, this way the student sees what is →	Beads with filler. supposed to be happening.	Beads with filler
It may easily take two weeks for the student to master the beads with filler exercise. Keep working on this until the student can run a straight bead with good contour.	Beads with filler. ALWAYS STAY WITH THE STUDENT WHEN HE/SHE IS WELDING.	KEEP STUDENT ON TASK EVERY DAY. Beads with filler.	Beads with filler. DO NOT ALLOW HORSEPLAY.	Beads with filler.
This week and next work on the butt weld with filler. Cut out pieces of metal 1½ inches wide and at least 3 inches long and butt weld them together. But Butt weld	Be sure you teach the student to leave the proper gap between the pieces of metal. Be sure to use the proper size tip for the thickness of the metal	Butt weld.	Butt weld	But weld.

TEST ON EQUIPMENT IDENTIFICATION FOR WELDING I (OXY-ACE. WELDING)

Directions; There are two ways to administer this test- 1. Hold up or point to the indicated item and have the student say the name of it, write down what the student says. 2. Say the name of the item indicated and have the student point to or hold up the item. Write dwon yes or no to indicate whether or not the answer was correct.

SAFETY GOGGLES _____

GLOVES _____

ACETYLENE TANK _____

OXYGEN TANK _____

CYLINDER VALVE _____

REGULATOR _____

CYLINDER PRESSURE GUAGE _____

WORKING PRESSURE GUAGE _____

ACETYLENE HOSE _____

OXYGEN HOSE _____

TORCH BODY _____

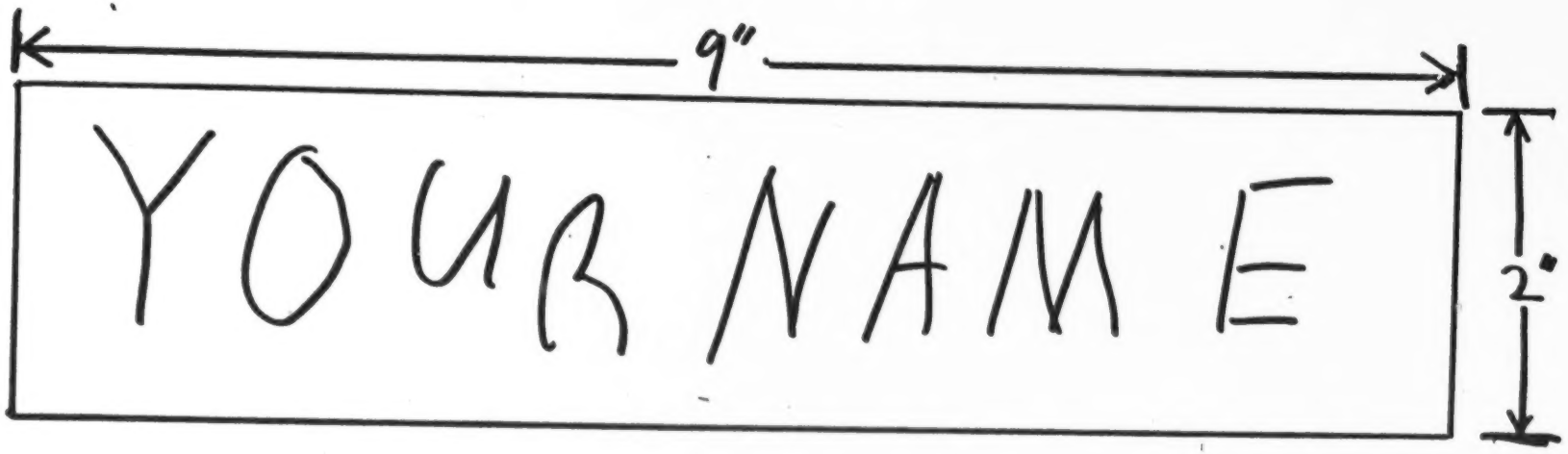
WELDING TIP _____

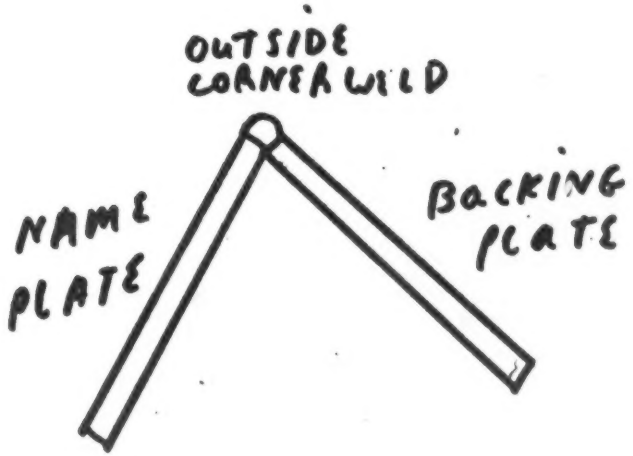
OXYGEN TORCH VALVE _____

ACETYLENE TORCH VALVE _____

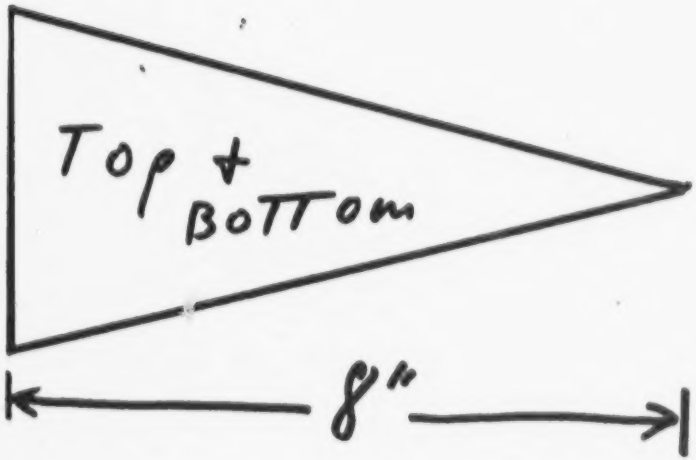
STRIKER _____

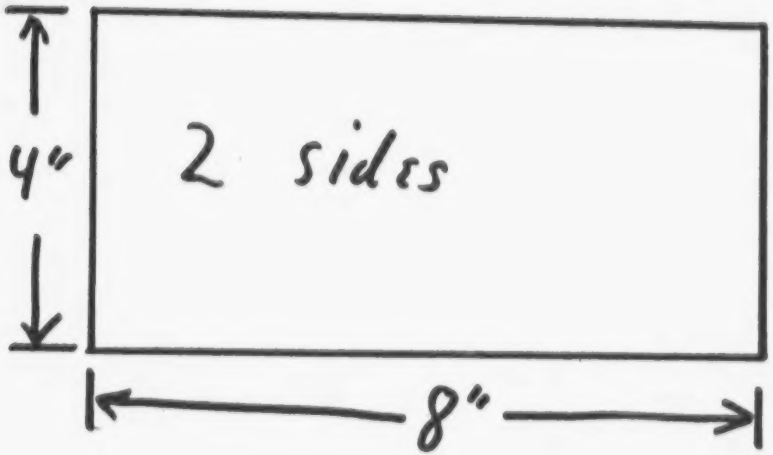
PROJECT #1

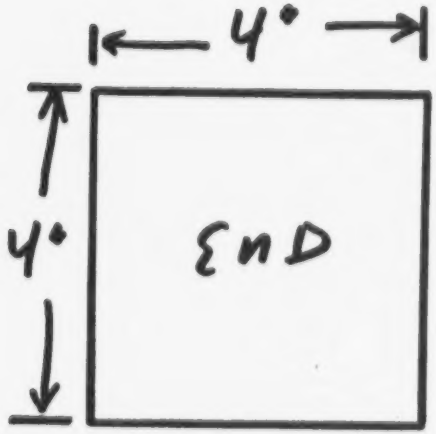




STUDENT WRITES NAME ON PLATE WITH 6013 ROD



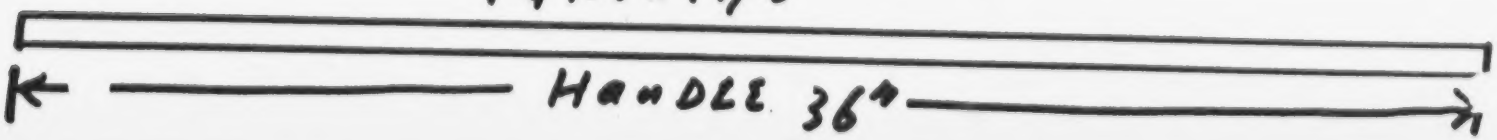




PROJECT #2

SPLIT MAUL

1/4" PLATE



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APPENDIX D-

Study Guides

This appendix is given to provide examples of the type of study guide which was referred to several times in earlier sections of this work.

Study guides of this type must be relevant to, indeed must teach specifically, information which the student will be tested on. They should be concise, simple, and designed with the D and H student's disabilities in mind. Study guides should include information and questions so as to incorporate the kinesthetic learning track in the learning process. (Writing the words helps the student to learn them.)

Again, these are only examples and should not be considered usable for just any class. Study guides of this type should be designed for use in a specific class' curricula.

Starter Motors

A starter motor is an electromagnetic device used to start an engine. It works on the "motor principle."

Electromagnetism is the key to the electrical system in a car.

The path of electricity in a starter motor is set up in series. This means that if, for some reason, one thing within that path goes bad, the whole starter motor will not work. A bad ground is the most common problem.

There are several different types of starter motors. The most common automotive starter is the overrunning clutch type.

The "motor principle" is responsible for turning electromagnetic force into rotational force. There are mechanical devices within the starter motor which connect the rotational force to the engine in order to start it.

To start an engine the starter motor needs a lot of torque. The faster the starter motor spins, the less torque it has. To keep the spinning speed of the starter motor from becoming too fast, most starters use a "shunt coil." The "shunt coil" is used to control the magnetism in the starter motor.

A "solenoid" is a device to use the force created in a magnetic switch to do something mechanical. The solenoid in a starter motor is there to connect the rotational (or turning) force of the motor with the engine's flywheel in order to start the engine turning. This happens because a magnetic switch in the solenoid closes and the "plunger" moves with it. The plunger makes the "shift lever" move. The shift lever makes the overrunning clutch and pinion move. The pinion has gears which mesh with gears on the flywheel of the engine. (Find some pictures to look at to help explain this process.) The armature turns the pinion which turns the flywheel which turns the engine and it starts (hopefully).

There are two sets of windings on the solenoid. One set pulls the plunger in and one set holds the plunger in. These windings are called "pull in" and "hold in." It takes more current to pull the plunger in than it does to hold it in. After the plunger is pulled in, the pull in windings aren't used so that more current can flow into the starter itself. At that point, the hold in windings are all that are needed.

When the engine starts, the starter motor is not needed anymore. A spring pulls the pinion back from the flywheel when the current to the starter motor is stopped.

On some starter motors, there are safety devices to keep you from ruining the starter by engaging it when the engine is already running. These safety devices are called "Adlo systems."

AUTO II STUDY GUIDE QUESTIONS

Starter Motors

1. What is a starter motor?_____

_____

2. A starter motor works on the "_____ _____."

3. What is the key to the electrical system in a car?_____

4. Starter motors are (series, parallel) circuits.

5. What is the most common problem with starter motors?_____

_____

6. What is the motor principle responsible for in a starter motor?_____

_____

_____

7. What is a "shunt coil" in a starter motor?_____

_____

8. Why is a shunt coil needed in a starter motor?_____

_____

9. What is a solenoid?_____

_____

10. What is the solenoid in a starter motor for?_____

_____

11. Describe how the magnetic switch, the solenoid, the plunger, the shift lever, the overrunning clutch, the pinion, the armature, and the flywheel work together to start the engine.

_____

_____

_____

_____

12. What are the two sets of windings called on the solenoid, and how do they work?_____

13. What happens to the starter motor when the engine starts?_____

14. What is an adlo system?_____

AUTO II STUDY GUIDE

The Motor Principle

An electric motor is a device to turn electric and magnetic force into rotational force.

When current moves through a conductor, a magnetic field is set up around it. If this conductor is near another field, then the two magnetic fields will push or pull each other depending on the relationship between them.

In a motor the conductor with the current is the armature and the magnet it is near is the field coil or field windings. Electricity is used to give both these parts a magnetic field. The parts are close enough so that the magnetic fields can push or pull each other. This pushing and pulling is called "attracting and repelling." (see "magnetism" study guide)

The armature in a motor is made to turn by being pushed and pulled around from the attracting and repelling forces in the magnetic fields.

QUESTIONS

1. What is the purpose of an electric motor?_____

   _____

2. What happens when current flows in a conductor?_____

   _____

3. What happens when one magnet enters into the field of another magnet?_____

   _____

4. In a motor we use_____to create a magnetic field. The parts that are magnetized are the_____and the _____ _____. Other names for pushing and pulling forces are_____and_____.

5. Explain how the armatures in a motor is made to turn.

   _____

   _____

   _____

Charging System

The alternator in a car has three functions. The alternator converts mechanical energy (the engine turning) into electrical current. The alternator keeps the battery charged and provides current to run the car when the engine is turning.

The alternator has replaced the generator in a car's charging system because alternators are lighter, simpler, have fewer moving parts and are easier to service.

Regulators are used to keep the battery from being overcharged. They regulate the amount of current being produced by the alternator.

Alternators work on the "motor principle" but they work in the opposit way to a starter motor. What happens in an alternator is that the conductor (wire) is moved around in magnetic field. As the conductor "cuts the lines of force" in the magnetic field a current is produced in the wire. As the conductor rotates in the magnetic field it changes direction so the current changes direction too. The current alternates.

The current must be changed in order to be able to charge the battery. Alternating current is different from direct current. We need direct current for the automotive system. Changing the current from alternating to direct is called "rectifying" and is done with a "rectifier." A rectifier is a group of diodes in the circuit which allow current to pass only in one direction.

After the current is rectified it can pass into the battery and recharge it or it can be used to run the car as long as the engine turns.

AUTO II STUDY GUIDE QUESTIONS

CHARGING SYSTEMS

Explain the three functions of the alternator.

1. _____

2. _____

3. _____

Why have alternators replaced generators?

_____

_____

What is the purpose of a regulator in the charging system? _____

_____

What process produces the current in an alternator? _____

_____

_____

What is the difference between alternating current and direct current? _____

_____

_____

What does a rectifier do? _____

_____

What is a rectifier made of? _____

_____

How does the rectifier work? _____

_____

_____

Batteries

A battery is a group of cells which store and supply electricity. Automotive batteries are needed to supply the current necessary to start the car. The amount of current a battery can supply is called "capacity."

All batteries work the same way. They are made of two different metals and a chemical, called an electrolyte, inside some kind of case. The chemicals inside react with the metal to produce the current. All you need for a battery are two unlike metals and an acid.

Automotive batteries have six cells. Each cell has a voltage of two volts. The cells are connected in series so the voltage is added. Six cells with two volts each added together equals twelve volts total, right? The automotive electrical system is a twelve-volt system.

Inside the batteries' cells there are certain metals. These metals react with the electrolyte to produce electricity. The metals in an automotive battery are: lead peroxide, sponge lead,

The sulfuric acid and water are mixed together to make the "electrolyte." The electrolyte is the liquid inside the battery cells. Sometimes you have to add water to the electrolyte when the level gets low. If the level drops very low and very quickly, this is probably because of overcharging. The electrolyte is 60% water and 40% acid.

The lead peroxide and sponge lead in the cell are attached to a grid to form the plates. The grid with the lead peroxide on it is the positive plate. It is red in color. The grid with sponge lead on it is the negative plate. It is gray in color. The two plates should never be allowed to touch. To prevent the plates from touching separators are installed between them. Separators are made of material which does not conduct electricity such as wood, rubber, plastic or spun glass. The number of plates per cell determines the capacity of the cell (how much current it gives). Groups of "plates" connected is called an element. More plates (elements) per cell gives more capacity.

All the positive elements are connected together in series and then hooked to the positive terminal (post). All the negative elements are connected in series and then hooked to the negative post (terminal).

When a battery is charged it is ready to give current from one post to the other. The state of charge of the battery tells whether it is charged up or run down. A tool to test the state-of-charge is called a hydrometer. The hydrometer tests the state-of-charge of a battery by indicating what the specific gravity of each cell is. Specific gravity is the weight of electrolyte compared with plain water. The more acid in the water the more specific gravity there is. The more acid in the water the better "charge" the battery has. See the connection?

AUTO II STUDY GUIDE QUESTIONS

Batteries

1. What is the purpose of the automotive battery?_____

_____

2. Define "capacity."_____

_____

3. What are all batteries made of?_____

_____

4. How does a battery produce current?_____

_____

5. How many cells are there in an automotive battery?_____

_____

6. Each cell has a voltage of_____.

7. In an automotive battery the cells are connected in_____

so the voltage is_____.

8. The total voltage in the battery is_____.

9. The metals in an automotive battery are_____.

10. The electrolyte in the battery is made up of_____.

11. Explain the effects of overcharging on the battery.

_____

_____

12. What is the "grid" in the automotive battery?_____

_____

13. What metal is on the positive plate?_____

14. What color is it?_____

15. What metal is on the negative plate?_____

16. What color is it?_____

17. Why are "separators" needed between the plates?_____

_____

18. What are "separators" made of?_____

19. What determines the capacity of a cell?_____

_____

20. What is an element?_____

21. Explain how the elements are connected to each other and to the terminal.

_____

_____

_____

22. Define "state of charge"_____

_____

23. How do we test the state of charge of a battery?_____

_____

24. What is "specific gravity?"_____

_____

25. How does acid affect specific gravity?_____

_____

Alternators, Generators and Regulators

Automobiles need electricity in order to operate the way they should. The battery supplies the current to get the engine started. Once the engine is started and running the generator or alternator takes over the job of supplying current to run the engine and the automotive accessories. The generator or alternator also has the job of recharging the battery so it will start the car next time.

Generators are not used on cars anymore. They were used on cars for many years and are still used on some tractors and small engines. Generators supply direct current (current that goes in only one direction). The battery on a car uses and supplies direct current. Since the battery and the generator both deal with direct current, they worked together.

Alternators are used on cars now-a-days. The modern automobile uses the alternator instead of the generator because alternators are lighter, simpler, and easier to fix. Alternators produce alternating current (current that goes in both directions on the wire alternately). Since the battery still works with direct current, there must be a way to change the current from the alternator into direct current. This is done with a system called a rectifier. The rectifier changes alternating current into direct current so that the battery and all the rest of the automotive accessories can use it.

Regulators are used in the charging system in order to regulate the amount of electricity being produced by the generator or alternator. Since the battery has 12 volts, it takes more than 12 volts to recharge it. But too much voltage in the system will overload it. Usually, it is best to keep the voltage in the system between 12 and 14 volts. That is what the regulator is for. The regulator keeps the voltage in the automotive electrical system within 12 to 14 volts so the battery is not overcharged.

AUTO II STUDY GUIDE QUESTIONS

Alternators, Generators and Regulators

What are the two jobs that generators and alternators perform?_____

_____

_____

T F Generators are still used on a lot of cars.

T F Generators are used on some tractors an small engines and not on modern cars.

The battery on a car uses and supplies (direct - alternating) current. (circle one)

Generators supply (direct - alternating) current. (circle one)

Alternators supply (direct - alternating) current. (circle one)

Explain the difference between direct current (DC) and alternating current (AC).

_____

_____

_____

T F Alternators are used on modern cars.

What are three advantages of alternators over generators?

1._____

2._____

3._____

What does a "rectifier" do?_____

_____

_____

Why does a modern car need a rectifier?_____

_____

_____

T F The automotive electrical system is a 12 volt system.

What does the regulator do?_____

_____

Why is a regulator needed in the automotive electrical system?_____

_____

T F The voltage must be kept between 12 to 14 volts.

Ignition Systems

The automotive ignition system has one important function. The ignition system has to produce a high-voltage current surge through the wires to the spark plugs and the surges have to come at the right time.

The spark plugs are in the cylinder in order to set off the air/fuel mixture with a spark and cause an explosion in the cylinder. The spark plug makes a spark by using a high-voltage current surge. The current flows down the center electrode and when enough push has built up, the current jumps. The current jumps accross at the tip of the spark plug. It jumps from the center electrode to the grounded electrode and makes a spark. The distance between the center electrode and the grounded electrode is called the spark plug gap.

The current gets to the spark plug by going through the spark plug wires from the distributor. The distributor is there is order to time the surges correctly. The distributor makes sure the spark plugs do their job at the right time.

There are two general types of ignition systems: The contact point type and the electronic type. Both types do the same job but they do it in a slightly different way. Both types get the high voltage current surge to the spark plug at the right time. The electronic type uses electronic parts to open and close the circuit between the battery and the ignition coil. The contact point type uses mechanically operated contact points to open and close the circuit between the battery and the ignition coil.

The voltage in an automotive electrical system is too low to cause the spark plug to fire. The battery, accessories, and the alternator all operate within a range of 12 to 14 volts. It takes much higher voltage to make the spark jump. The ignition coil transforms the low-voltage in the system into the high-voltage needed to make the current jump the spark plug gap.

The ignition coil has two circuits in it. They are called the primary and secondary. The primary circuit consists of hundreds of turns of wire wrapped around an insulating material. The secondary circuits consists of thousands of turns of smaller wire wrapped around an insulating material. The primary circuit surrounds the secondary circuit inside the coil case.

The ignition coil produces the high-voltage surge which ends up making the spark plug fire. At first the electric current coming into the coil has only about 12 volts. This current flows in the primary circuit. The current in the primary circuit creates a magnetic field within the coil. When the parts which control the timing open the circuit between the battery and the ignition coil the current stops and the magnetic field collapses. When the magnetic field created by the current in the primary coil windings collapses a high voltage surge is created in the secondary coil windings. This high-voltage surge of current flows out of the high-voltage terminal on the coil.

We have seen how the high voltage surge of current is produced. Now we need to know how it gets to the spark plug at the right time.

The high-voltage surge of current flows out the high-voltage terminal on the ignition coil. A wire connects the high voltage coil terminal with the center terminal of the distributor. The distributor makes sure that the high voltage current surge gets to the right spark plug at the right time. Certain parts inside the distributor do this job. The parts are called the rotor and the distributor terminals. The spark plug wires are connected to the outside of the distributor terminals.

To summarize the process which takes place in the ignition system:

1) 12 volt current in the system flows into the distributor from the battery
2) The current flows through the contact points or some other timing device
3) The current flows out of the distributor and into the primary coil winding
4) The current flow is interrupted by the contact points or other timing device
5) A high-voltage current surge is created in the secondary coil winding
6) The high voltage current surge flows out of the coil and back to the distributor
7) The high voltage current surge flows through the center distributor terminal into the rotor
8) It then flows from the rotor to one of the other distributor terminals and out through the spark plug wire to the spark plug
9) The high voltage current surge jumps across the spark plug gap and is grounded out on the engine block.

AUTO II - STUDY GUIDE QUESTIONS

Ignition Systems

1. What is the function of the ignition system?_____

_____

_____

2. What is the purpose of a spark plug?_____

_____

3. What is the spark plug gap?_____

_____

4. What causes the spark to jump across the gap?_____

_____

5. What is the main job of the distributor?_____

_____

_____

6. What are the two general types of ignition systems?_____

_____

7. How are these two types the same?_____

8. How are these two types different?_____

9. What is the main job of the ignition coil?_____

_____

10. Why do we need an ignition coil in the automotive electrical system?_____

_____

11. The names of the two circuits in the ignition coil are_____and_____.

12. Explain what the primary circuit is made of._____

_____

13. Explain what the secondary circuit is made of._____

_____

14. How many volts are in the primary circuit?_____

15. What happens to the voltage output in the secondary circuit?_____

_____

16. How is the high voltage current surge produced in the secondary circuit?_____

_____

17. A wire connects the_____ _____ terminal on the ignition coil with the_____terminal on the distributor. What parts, inside the distributor, help the spark plug do its job at the right time?_____

_____

18. Summarize the process which takes place in the ignition system.

1)_____

_____

2)_____

_____

3)_____

_____

4)_____

_____

5)_____

_____

6)_____

_____

7)_____

_____

8)_____

_____

9)_____

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9) "Vocational Development of Special Needs Individuals: Module III-Identifying Barriers to Learning"

Ibid.

The idea of "criterion referenced testing" is discussed.

10) "Vocational Development of Special Needs Individuals: Module IV- Teaching the Special Needs Students"

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The idea of an "Informal Reading Inventory" is discussed. This is a skills check type of test. Also discussed are: methods of assessing the reading levels of textbooks, methods of teaching vocabulary, assisting students to read difficult texts, and study skills.

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Washington State Commission for Vocational Education
Bldg. 17 Airdustrial Park
Olympia, Washington

Covers the history and development of criterion referenced testing or "skills check" testing. Specifically applicable to students on the community college level. Excellent explanation

and rational for the skills check system although quite technical. Not for direct use with secondary D and H students but a very good reference with which to make up one to fit the needs of any population.

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John L. Scott and Michelle Donnelly Sarkees
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